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Compendium -

Approaches to Improve the Nutritional Status of the  
Pre-School Child

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the

This collection of programs to improve the nutritional status of the pre-school child. It has been undertaken as a preliminary step in identifying programs, or program elements, that may be of use in program planning and design. It will be used as a basis for further analysis.

The descriptions seek to include information on: (1) how the program works, (2) who it reaches, (3) what is its nutritional effectiveness, (4) does it also contribute to other development goals, health, education, etc., (5) what are the estimated costs. Individual examples of different approaches are used, recognizing at the same time that a given approach may have considerable variation.

The effort is basically a one man undertaking of several months which sought to quickly pull together available information from published material and interviews. The material presented has not been reviewed by those responsible for the programs, and where necessary, assumptions, or estimates, concerning mode of operation, impact, etc., are made. The bases from which the cost figures are derived are not necessarily comparable in all cases. Since a change in a basis used can significantly affect final costs, the figures presented here should be treated with this in mind.

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TYPE: Take-Home Food Distribution

EXAMPLE: Mixed Food Distribution from Community Centers -  
Philippines (CRS - Proposed Program)

Purpose:

To provide nutrition supplements to pre-school children and pregnant and lactating women and to educate mothers in nutrition.

Delivery System:

Food supplements are distributed monthly and nutrition education instruction is provided bi-monthly. Line personnel are volunteers. A weight chart is used to identify malnourished children and monitor improvement.

Target Group Reached:

Age: 6 mo.-6 years; plus pregnant and lactating women

Location: Villages and Urban Areas

Impact:

Supplement appears adequate to meet deficiencies. Question can be raised as to whether would be used properly - e.g., consumed as additive to normal diet by vulnerable group rather than whole family. Program may be capable of reaching 70% of malnourished pre-school children.

Contribution to Other Programs:

Expected to eventually serve as point of entry for promotion of other programs, such as family planning.

Annual Per Capita Cost:

Per individual reached: \$12.50

Per individual in need: \$12.50

Who Pays:

Government: \$.58, Recipient \$.16; External Donor \$11.73.

# I. DESCRIPTION OF PROGRAM

## A. Purpose, Services Delivered, Method of Delivery

The following is a description of a proposed program as described in Catholic Relief Services' original program plan for FY 73. All statements made pertain to the proposal, as distinct from more limited ongoing activities, unless specific reference to such ongoing programs is made.

The purpose of the proposed program is to provide nutrition supplements to pre-school children and to pregnant and lactating women and to educate mothers in nutrition. This is a national program which will seek to cover 70% of the entire vulnerable group in need.

A take-home food supplement ration will be distributed once per month at centers located in urban and rural areas. (As an alternative to monthly distribution of food, daily feeding will be encouraged where possible.) Centers are normally structures that are used for other purposes, e.g., a church or a meeting house. Classes will be held at the center twice a month. The purpose of the classes will be to provide instruction in both preparation of the supplement and the use, and/or cultivation, of other local foods. The program and its message will also be publicized via posters and handout educational material. The children will also be weighed once each month, and their progress recorded on a weight chart. Children who reach normal status will be graduated from the program. (1)

The intention is that the only children provided the supplement will be those with a real need as indicated by their weight. When a child reaches satisfactory weight he is graduated from the program. It is estimated that about 20% of the pre-school population fall in this malnourished category. (2)

## B. Administrative Organization and Personnel

### 1. Auxilliary

At the local level, one volunteer will supervise a mother/child class which will meet twice monthly. The volunteers come from the local community. They may include personnel with related background such as nurses, midwives, home management technicians and other government or private workers with nutrition dietetics or home economics. They are given on the job training by a nutrition program assistant described below. An enrollment fee of 1.3¢ per recipient per month is proposed to help cover operating costs. Where mothers volunteer to assist the center consignee, compensation in the form of food for work may be provided. (Further resources might be derived from the sale of empty containers and an assessment to the barrio treasury.) Each center would hold classes for five groups of children. Each group would have about 30 to 35 children. (Referrals to health facilities are made for children requiring health care.)

### 2. Technician/Supervisor

Providing general guidance for the local workers is the Nutrition Program Assistant. Each Assistant would have

responsibility for roughly 20 centers. Her duties include making periodic visits to centers; holding training seminars and disseminating teaching aids to local workers; receiving and approving new applicants to the program; meeting with local leaders to introduce the program. The Nutrition Program Assistant would be given a two-week training course.

### 3. Higher Level Supervision and Administration

Eight regional coordinators will supervise the 128 Nutrition Program Assistants. Duties include; recruitment and training; developing plans for implementation of the program at the regional level; acting as liason with the Manila office.

Control of the program will be exercised by four assistant administrators, one each for logistics, operations, education and agriculture.

The PL 480 food will be channeled through diocesan Social Action Departments which CRS is assisting to develop. The objective is to promote the growth of a counter part agency which will eventually assume responsibility for the entire program. (It would appear that CRS coordination of the program includes inputs from other U.S. Voluntary Agencies operating in the Philippines.)

## II. WHO PROGRAM REACHES

### A. Numbers Served

30 to 35 children will be served by each mothercraft class. A single center would service five separate classes, or 150 to 175 children. In addition, about 40 to 50 pregnant and

lactating women will be enrolled at the center and receiving food supplements.

By the time the program is in full operation (end of FY 73) it is projected that 560,000 pre-school children and 140,000 women will be participating. It is estimated that this would constitute roughly 70% of the 20% of pre-school children that are considered malnourished.

## B. Qualifications for Participating in the Program

### 1. Location

The centers are located in cities or villages. It is believed that approximately 70% of the population lives within four km. of such locations.

### 2. Age Range of Vulnerable Group Members Included in Program

Age of children is six months to 72 months (six years); pregnant and lactating women will also be accepted.

### 3. Socio-economic Status

Only moderately and severely malnourished children will be accepted. The Nutrition Program Assistant will train a volunteer team (one weigher and one recorder) to conduct a house to house survey, which will be the basis on which participants are selected. To qualify, children must be 75% or less of standard body weight, except for children six months to 11 months of age, who can qualify if they are up to 90% of standard body weight.

It is proposed that participants pay an enrollment fee of about 1.3¢ per month. (1) This has not been found a bar to participation, but will be waived should an individual be unable to pay.



4. Institutional Participation

No special institutional participation is required.

5. Other Factors Affecting Participation

Projected program will include posters and contacts with local leaders as well as nutrition education lectures and demonstrations which will presumably have acceptance as one of their objectives. (1)

C. Estimate of Coverage Program Potentially Capable of Providing

The centers will be located in fairly heavily populated areas. It is not, however, clear whether their reach will extend to the 70% of the total population which is projected to be reached by the program.

III. EFFECTIVENESS OF PROGRAM

A. Supplement

1. Composition

Six pounds of CSM and two pounds of rolled oats will be provided for each recipient each month. (1)

2. Source or Sources of Food Used

The supplement will be provided by the U.S. PL 480 donation program.

B. Extent Supplement Meets Deficiencies

1. Judgement and Narrative Comment

The supplement appears adequate to meet the main deficiency, provided no substitution for normal meals occurs.

2. Intake and Other Information

Nutrient	: Dietary : Normal :	: Addition to:	Percent of defi-
	: allowance : intake : Deficiency:	diet (sup- : ciency met by	
	: used <u>1/</u> :	: plement, etc):	supplement
	: <u>1/</u> :	:	:
Protein	: 30 : 28 :	: 22 :	: met with
	: <u>1/</u> :	:	: large overage
Calories	: 1,300 : 800 :	: 456 . :	: 91%
	: <u>1/</u> :	:	:

1/ Referenced in Fraleigh address. (3)

C. Percentage of Those Reached Estimated to Actually Have Significant Deficiency

Approximately 100% of those reached should be in need due to fact that targeted approach is used.

D. Clinical or Other Evaluations

A CRS assessment of a current program where daily feeding is provided indicated that: a. the nutrition standard was raised significantly while the children were being fed; b. six months after graduation, the children were still gaining weight at a better rate than upon entry into the program. (1)

Other experience with this type of program raises a question as to whether the dry distribution approach will work on a large scale. An answer may lie in the type of individual follow-up which it is feasible to provide.

IV. CONTRIBUTION TO OTHER PROGRAMS

Family planning and other community workers will be invited to take part in mothercraft bi-monthly classes. Examples of subjects which might be disseminated from the centers are agriculture, health and hygiene, and responsibility parenthood.

V. PROGRAM COSTSA. Annual Operating Cost Per Service Unit

	: : Central : government :	: : Local : community : or : individual :	: : External : donor :	: : Total :
<u>Food</u>			\$5,644,000	\$5,644,000
(Raw materials)	: ( )	: ( )	: ( )	: ( )
(Processing)	: ( )	: ( )	: ( )	: ( )
<u>Transportation to Site</u>				
(includes handling and storage)	\$219,000 <sup>3/</sup>		\$2,569,000	\$2,779,000
(Within country)	: (\$219,000)	: ( )	: ( )	: (\$219,000)
(External)	: ( )	: ( )	: (\$2,569,000)	: (\$2,569,000)
<u>Provision of Services at site</u>				
	\$166,847 <sup>1/</sup>	\$111,552 <sup>4/</sup>		\$278,399
(Operating personnel)	: (\$166,847)	: (\$111,522)	: ( )	: (\$278,399)
(Recurring Materiel costs)	: ( )	: ( )	: ( )	: ( )
<u>Motivation</u>				
Costs - if applicable, to get consumers to accept food or other- wise participate in program				
<u>Administration</u>				
	\$26,831 <sup>2/</sup>			\$26,831
(Program direction)	: (\$21,863)	: ( )	: ( )	: (\$21,863)
(Training)	: (\$4,968)	: ( )	: ( )	: (\$4,968)
<u>Other</u>				
<u>Total</u>	\$403,678	\$111,552	\$8,213,000	\$8,728,230

Number of individuals served which should be used to convert above figures to a per capita basis. 700,000

Total per capita operating cost \$12.46

- 1/ 128 Nutrition Program Assistants, Salaries, Travel and Per diem. As proposed this budget item and the costs of administration below would probably include contributions from the Philippine Government, CRS, and USAID.
- 2/ Includes 8 Regional Supervisors
- 3/ Derived by applying rough estimate of current GOP costs to expanded program.
- 4/ Based on contribution of 1.3¢/month for each recipient.

B. Cost of Physical Structure and Equipment

	: Government	: Local community	: External donor	: Total
Per Unit <u>1/</u>	:	:	:	:
	:	:	:	:
	:	:	:	:
	:	:	:	:
	:	:	:	:
	:	:	:	:
	:	:	:	:

1/ Existing local facilities are used (usually either a parish building or a community multi-purpose center). Information on allocation for equipment not obtained, considered a minor cost.

C. Annual Costs Including Capital Depreciation, Interest on Investment, and Maintenance

	: Total	: Central government	: Local community or individual	: External donor
<u>Total operating cost</u> (from V "A" above)	\$8,728,230	\$403,678	\$111,552	\$8,213,000
See <u>1/</u> above	:	:	:	:
<u>Total of :</u>	:	:	:	:
(Depreciation)	( )	( )	( )	( )
(Interest)	( )	( )	( )	( )
(Maintenance)	( )	( )	( )	( )
Total Annual Costs	:	\$403,678	\$111,552	\$8,213,000
Total per-capita Annual Costs	\$12.46	\$.58	\$.16	\$11.73

D. Annual Per Capita Operating Costs Per Individual Actually  
in Need in Target Group Reached

Should be same as above, as targeted approach is used.

E. Estimated Share of Costs of Program Which Can be Charged  
Off to Other Program Purposes

The program, as noted in Section IV, would appear to serve as a point of entry for the promotion of related programs. The portion that could be charged off would vary depending on how vigorously advantage was taken of this point of entry.

F. Discussion

The costs described above do not include an evaluation component that would probably be needed in a large program. It is also believed that some additional cost should be attributed for the time spent by government nutrition program personnel. Information on amount has been determined. It is believed that neither of these additions would greatly change the overall per capita cost figures.

The cost of food for work which may be used for mothers who volunteer to help the individual in charge of the center is not included.



AppendixCOMPILER'S COMMENTS ON PROGRAMA. Potential Strengths and Special Characteristics

This is a nationwide program, as projected, which at the same time will be organized and coordinated by a U.S. Voluntary Agency-CRS.

It is a targeted program which seeks to provide protein and caloric requirements for almost a nationwide need group through PL 480 resources.

Food for work is used in some instances for mothers who assist the individual in charge of the center.

B. Question Areas

Question can be raised as to whether dry monthly distribution really is fed to the young child where needy families are involved. This is, of course, also related to the nutrition education impact of the program, and to extent of individual follow-up that is feasible.

CAUSES OF MALNOURISHED STATEA. Reasons for Food Deficiency

Information as to relative importance of lack of income and lack of knowledge in contributing to dietary deficiencies was not obtained. (Data from Laguna Province on body weights shows physical growth of children more seriously impaired in families with more than two pre-school age children than in families with one or two. In families where children were spaced less than 18 months apart, the growth process was more seriously affected. (2)

B. Other Contributing Causes1. Prevalence of Disorders (2)a. Extent of diarrhea

Gastro enteritis is generally considered to rate high as a cause of illness and death in young Filipinos along with the other diseases noted below.

b. Extent of Parasitic Infection

Not obtained

c. Extent of Disease Effecting Children

TB, broncho pneumonia, whooping cough, measles are generally considered to rate high as causes of illness and death in young Filipinos.

2. Relative Importance of Disorders

Not obtained.

PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSIONA. Present Coverage of Program Type

CRS reports pre-school programs in operation in 13 central South American Countries (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Haiti, ~~Dominican~~ Republic, Bolivia, Colombia, Ecuador, Paraguay and Peru); 4 Asian countries (India, Indonesia, Philippines, South Vietnam); and 13 African countries (Cameroons, Burundi, Ghana, Kenya, Lesotho, Morocco, Malagasy Republic, Rwanda, Senegal, Sierra Leone, Tanzania, Togo and Upper Volta).(5)



B. Mechanisms Presently Available for Implementing Program Type

1. Existing Institutions

Local facilities, such as community meeting houses or churches, would be used. It is estimated that 70% of the population is within four kilometers of such facilities.

2. Local Resources

A charge of about 1.3¢ per month per recipient is proposed. This would constitute a contribution by the individual to the program of about 1%.

3. Local Manpower Source

The basic operating personnel are local volunteers

Source of Information

1. Proposed Expansion of the Targeted Maternal and Child Health Program - Catholic Relief Services, FY 73 Program Plan.
2. USAID Non Capital project Paper (submitted May 1972).
3. Address on "The Philippine School Nutrition Program" May 1971; B. Fraleigh USAID.
4. Haglund, E. "A Note on the CRS - Sponsored Pre-school Health-Nutrition Education Program in Central and South America, Asia, and Africa" - Mimeo-January, 1972.
5. Pavis, P. Letter to compiler; October 2, 1972.

TYPE: Take-Home Food Distribution

EXAMPLE: Milk Distribution from MCH Clinics - Dominican Republic  
(CARE)

Purpose:

To provide protein supplement for vulnerable groups.

Delivery System:

Milk powder is distributed twice monthly at maternal and child health clinics. Nutrition education is also provided.

Target Group Reached:

Age: 0-6 years; plus pregnant and lactating women.

Location: Urban and rural

Impact:

Improves protein and vitamin and mineral intake, not applicable to calorie needs.

Coverage is determined by reach of MCH centers.

Contribution to Other Programs:

May have an impact on family planning acceptance.

Annual Per Capita Cost:

Per individual reached: \$10

Per individual in need: \$20

Who Pays: Government = \$1.30; External Donor = \$8.70

## I. DESCRIPTION OF PROGRAM

### A. Purpose

The purpose of this program is to improve the nutritional status of pre-school children and pregnant and lactating women via distribution of a protein supplement and through nutrition education.

The program functions through an existing network of maternal and child health clinics. All children 0-6 coming to the clinic are weighed. Children age 1-6 under 85% of weight for age are admitted. In addition, the siblings of malnourished children are also eligible. All pregnant and lactating women are eligible.

A food supplement is distributed at the clinic to mothers twice a month for preparation at home. Children who attain normal weight for age are graduated from the program after they remain at this level for six months. Normal children are checked every three months.

The mothers participating in the program are given group or individual nutrition education instruction. Some home visits are also made and it is planned to organize mothers' clubs with the help of Peace Corps Volunteers.

### B. Administrative Organization and Personnel

#### 1. Auxiliary and Technician/Supervisor

The basic executing personnel of the program are the regular staff of the MCH center which may include a medical director, nurses, nurse auxiliaries and social workers.

The auxiliaries, and in some instances a higher level technician or doctor, identify those eligible for the program. As indicated above, classification of malnourished children is made on the basis of weight. The clinic is supposed to function as a

team, so that, for example, it is the midwife who refers pregnant women to the program. Similarly, a nurse may conduct the nutrition education demonstration.

## 2. Higher Level Supervision and Administration

The program is the responsibility of the Division of Nutrition of the Secretariat of Public Health. This division is assisted in implementation by the State Sugar Council and the Dominican Agrarian Institute.

In the program described here, CARE is responsible for coordinating food distribution. Some technical assistance is received from WHO.

## II. WHO PROGRAM REACHES

### A. Numbers Served

Information on numbers served by a single delivery unit was not obtained, but would appear quite large perhaps several hundred, with groups of about 50 picking up food supplements at any one time.

### B. Qualifications for Participating in the Program

#### 1. Location

Not specified, appears to be both urban and rural where clinics exist.

#### 2. Age Range of Vulnerable Group Members Included in Program

Pre-school children 0-6 and pregnant and lactating women. About 70% are pre-schoolers and 30% women.

#### 3. Socio-economic Status

All income levels are eligible. No fee is indicated.

#### 4. Institutional Participation

Food supplements are distributed at MCH centers. And children

are identified as malnourished in the course of their visits to MCH centers.

C. Estimate of Coverage Program Potentially Capable of Providing

The program is dependant on the existence of MCH centers. As coverage by MCH centers in most countries is quite limited, particularly in rural areas, the approach appears most suited to areas of high population density. Information was not obtained as to whether within the area served by the center most children suffering from malnutrition would in fact be located and identified. This would appear to depend on the extent to which the clinic was used by all families.

III. EFFECTIVENESS OF PROGRAM

A. Supplement

1. Composition

Ration is two pounds of non-fat dry milk.

2. Source or Sources of Food Used

U.S. PL 480 donation program.

B. Extent Supplement Meets Deficiencies

1. Judgement and Narrative Comment

The supplement provides 54% of protein allowance for children 4-6. The addition to calorie intake would not appear significant.

## 2. Intake and Other Information

Nutrient	: allowance	: Normal intake	: Deficiency	: Addition to diet (supplement, etc):	: Percent of allowance met
Protein	: 22 g	1/	:	: 12 g	: 54%
Calories	: 1,700	2/	:	: 121 cal.	: 7%
Vitamin A	: 2,500 IU	3/	:	: 1,500 Iu	: 60%

1/ FAO 1965 protein standard - Computation: Average weight 5.5 years = 16 kg. (The World Food Problem Vol. III, p. 25.) Allowance NPU 70 = 1.39 g/kg = 22.

2/ FAO, 1957 Calorie Standard.

3/ National Academy of Science - RDAs - 1968.

### C. Percentage of Those Reached Estimated to Actually Have Significant Deficiency

The program uses a targeted approach in which malnourished children are identified for treatment. At the same time, other children are included as a preventive measure. Thus all children 0-1 are eligible and siblings of malnourished children, also all pregnant and lactating women. It is estimated, accordingly, that approximately one half of those reached suffer from significant deficiency. (It should be noted that certain efficiencies may accrue to a program which has a preventive aspect.)

### D. Clinical or Other Evaluations

Information as to whether evaluation undertaken not obtained.

## IV. CONTRIBUTION TO OTHER PROGRAMS

The program itself effects only nutrition directly. However, the fact that it is executed within an MCH clinic setting which includes provision of family planning services might have an influence on family planning acceptance.

V. PROGRAM COSTSA. Annual Operating Cost for Program <sup>1/</sup>

	: : Central : government	: : Local : community : or : individual	: : External : donor	: : Total
<u>Food</u>			\$326,198	\$326,198
(Raw materials)	: ( )	: ( )	: ( )	: ( )
(Processing)	: ( )	: ( )	: ( )	: ( )
<u>Transportation to Site</u> (includes handling and storage)	\$7,680		\$23,420	\$31,100
(Within country)	: ( \$7,680 )	: ( )	: ( )	: ( \$7,680 )
(External)	: ( )	: ( )	: ( \$23,420 )	: ( \$23,420 )
<u>Provision of Services at site</u>	\$20,000			\$20,000
(Operating personnel)	: ( \$20,000 )	: ( )	: ( )	: ( \$20,000 )
(Recurring Materiel costs)	: ( )	: ( )	: ( )	: ( )
<u>Motivation</u>				
Costs - if applicable, to get consumers to accept food or other- wise participate in program				Not applicable
<u>Administration</u>				\$35,209
(Program direction)	: ( \$35,209 )	: ( )	: ( )	: ( \$35,209 )
(Training)	: ( )	: ( )	: ( )	: ( )
<u>Other</u>				
Total	\$62,889		\$349,618	\$412,507

Number of individuals served which should be used to convert above figures to a per capita basis. 40,000

Total per capita operating cost 10.31

<sup>1/</sup> Cost data provided by CARE (1) as rough estimate.



B. Discussion

The capital infrastructure of the existing MCH center network is used. No allocation of capital infrastructure costs for this network is made.

The program, as described (1), uses an expensive commodity. For example, if two pounds of soy fortified rolled oats were added to the monthly ration of two pounds of milk, per capita costs would only increase by \$2.18 to \$12.49. This addition, which is projected in a FY 73 request would add 50% more protein and 100% more calories. (It should be noted that non-fat dry milk may be a type of commodity which is more apt to be understood and used as a true supplement for child, whereas a solid food may have more likelihood of being considered incremental to the general family food budget.)

C. Annual Per Capita Operating Costs Per Individual Actually in Need in Target Group Reached

Based on estimate in III C, costs per person in need would be approximately \$20. (Efficiencies of program prevention aspects of reaching a larger number should also be considered.)

D. Estimated Share of Costs of Program Which Can Be Charged Off to Other Program Purposes

It is possible that some of the costs could be charged off to contributing to family planning acceptance.



AppendixCOMPILER'S COMMENTS ON PROGRAMA. Potential Strengthes and Special Characteristics

The program is directed at the entire vulnerable group including children 0-2 and pregnant and lactating women.

The fact that a supplement is provided in conjunction with maternal and child health services may increase the contribution the supplement makes by limiting infection which might otherwise interfere with effective food utilization.

Peace Corps Volunteers are used as a resource in the program.

B. Question Areas

The program does not provide a calorie supplement. (It should be noted that improving protein intake alone may have an indirect effect on calorie intake by increasing the child's general appetite and demand for food (3). In addition, the nutrition education provided may affect home feeding practices with respect to calorie intake.)

CAUSES OF MALNOURISHED STATEReasons for Food Deficiency

Information as to relative importance of food availability and lack of knowledge was not obtained.

PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSIONA. Present Coverage of Program Type

Distribution of milk at MCH centers is a fairly common pre-school feeding technique. Information on extent not obtained.

B. Mechanisms Presently Available for Implementing Program Type

1. Existing Institutions

The approach requires an MCH network.

2. Local Resources (Excluding Personnel)

In the example given community contributions are not significant.

3. Local Manpower Source

Indigenous manpower is not particularly used.

Source of Information

1. CARE communication to compiler, September 15, 1972.
2. CARE Operational Procedures Report 1972.
3. Mata, L., Bressani, R., LaChance, P., "Corn Fortification: A Field Demonstration Model," Mimeo, 1971.



TYPE: Daily FeedingEXAMPLE: Special Feeding Centers - Colombia (CARE)Purpose:

To provide a nutritional supplement for pre-school children on a daily basis.

Delivery System:

Daily meal is provided for pre-school children at nutrition centers.

Target Group Reached:

Age: 1½-6 years

Location: Needy urban and rural areas.

Impact:

Supplement appears adequate to improve nutritional status, assuming there is not a large substitution effect. Daily feeding should ensure consumption.

The reach of the program appears limited in terms of geographic area, and possibly also regular attendance.

Contribution to Other Programs:

Not directly applicable.

Annual Per Capita Cost:

Per individual reached: \$30

Per individual in need: \$30

Who Pays: Central Government: \$3; Local Community: \$4; External Donor: \$2

# I. DESCRIPTION OF PROGRAM

## A. Purpose, Services Delivered, Method of Delivery

The purpose of this program is to provide a nutritional supplement for pre-school children on a daily basis.

A daily ~~meal~~ is provided to pre-school children at specially constructed centers located in poor rural and urban communities.

The centers are operated by three man teams funded via an enrollment fee.

The children are brought to the center by an elder child or mother specifically for the meal and are then taken home.

Malnourished children are referred by the health center which maintains liaison with the nutrition center, including periodic visits. (2,5)

## B. Administrative Organization and Personnel

### 1. Auxiliary

One administrator and two cook helpers form the staff of the typical center.

### 2. Technician/Supervisor

Personnel of the Colombian Applied Nutrition Program (~~PINA~~) are beginning to provide technical inputs such as nutrition training sessions for center administrators and periodic nutrition education classes for the mothers of the recipients. Sewing and other forms of home economics may also be included. (~~PINA~~ has medical coordinators and nutritionists in their departmental offices.)



## Higher Level Supervision and Administration

Overall responsibility for direction falls to CARE which coordinates at the national level with the Colombian Institute of Family Welfare and the National Planning Office.

At the departmental level CARE undertakes the planning in conjunction with PINA, if there is a PINA office in the department. CARE seeks to establish departmental food programming committees for pre-school and school programs. These committees include the sectional health service, Department of Education, agricultural authorities, the departmental government, and PINA. It is anticipated that PINA will eventually take over responsibility for operation of this program, with CARE exercising a monitoring role. (2)

## II. WHO PROGRAM REACHES

### A. Numbers Served:

A standard center feeds around 250 pre-school children daily in urban areas. (2) Over 25,000 pre-school children are served through the program.

### B. Qualifications for Participating in the Program

#### 1. Location

The centers are located in the most needy urban slums and rural communities. (3)

#### 2. Age Range of Vulnerable Group Members Included in Program

Age range is 18 months to six years. (Pregnant and lactating women are not served by program.)

### . Socio-economic Status

Participants normally pay a fee for participation in the program. During 1972 progress has been made in broadening the utilization of food scholarships provided by civic organizations and municipal governments. (2) Information on whether (and to what extent) the present fee program interferes with participation of neediest groups has not been obtained.

### . Institutional Participation

Program serves those who are able to come to a nutrition center for daily feeding.

### . Other Factors Affecting Participation

Nutrition education is provided to mothers.

Regular attendance of children is perhaps two-thirds of those initially admitted to program.

### C. Estimate of Coverage Program Potentially Capable of Providing

It should be noted that the program may be limited in out reach by three factors: (1) effective radius of center; (2) age that can partake of meal at center; (3) ability to pay enrollment fee. (Geographic range has been estimated at 8-10 blocks).

## III. EFFECTIVENESS OF PROGRAM

### A. Supplement

#### 1. Composition

The following PL 480 commodities are provided:

<u>Commodity</u>	<u>Oz. Per Day</u>
HFDM	1.28
CSM	1.08
Wheat Flour	.64
Bulgar Wheat	.64
Vegetable oil	.64
	<hr/> 4.28

In addition, the menus typically included fruit and a salad or vegetable. The main dish, which is often a soup, is based on bulgur and CSM. (1) Local foods constitute perhaps 30% of the total meal.

#### Source or Sources of food Used

The food comes from the U.S. food donation program and from the local community.

#### B. Extent Supplement Meets Deficiencies

##### Judgement and Narrative Comment

The supplement covers the full protein allowance and about half the calorie allowance for 4 to 6 year olds. Whether the caloric allowance is adequate would probably depend significantly on whether other meals are served the child at home are reduced or held constant. Information on this point was not obtained.

##### Intake and Other Information

Nutrient	Dietary allowance used <sup>1/</sup>	Normal intake	Deficiency	Addition to diet (supplement, etc.)	Percent of allowance met
Protein	<sup>1/</sup> 21 g 4-6 yr. old		Not obtained for children - both	<sup>3/</sup> 23 g	Over 100%
Calories	<sup>2/</sup> 1700 5 yr. old - FAO		protein & calorie deficit observed	<sup>3/</sup> 786	46%

- <sup>1/</sup> Protein Requirements - FAO/WHO - 1965 (for computation see appendix).  
<sup>2/</sup> Calorie Requirements - FAO/WHO - 1957  
<sup>3/</sup> CARE communications (1) Protein is computed only for food provided by PL 480. Calories includes an estimate 250 calories from local foods.

C. Percentage of Those Reached Estimated to Actually Have  
Significant Deficiency

Admission to program is based on nutritional status, so  
that only those in need should be reached.

. Clinical or Other Evaluations

Not available.

IV. CONTRIBUTION TO OTHER PROGRAMS

Program is not currently providing other significant non-nutrition services. However, CARE hopes that in the future, the nutrition centers will in fact become multi-purpose centers. And at the present time it should be noted that liaison is maintained with the health centers, with a periodic visit to the nutrition center made by health personnel.

In addition, the nutrition centers provide feeding for some school age children.

A. Annual Operating Cost For Program

	Departmental Government	Local Community or Individual	External Donor	Total
<u>Food</u>			\$567,111	\$567,111
(Raw Materials)	( )	( )	(includes ocean freight)	( )
(Processing)	( )	( )		( )
<u>Transportation to Site</u>	\$52,740			\$52,740 <sup>1/</sup>
(includes handling & storage)	(includes contributions to operations & administration)			
(Within Country)	( )	( )	( )	( )
(External)	( )	( )	( )	( )
<u>Provision of Services at Site</u>		\$71,413 <sup>3/</sup>		\$71,413
		(includes food & enrollment fee)		
(Operating Personnel)	( )	( )	( )	( )
(Recurring Material Costs)	( )	( )	( )	( )
<u>Motivation</u>				
Costs - if applicable, to get consumers to accept food or otherwise participate in program				
<u>Administration</u>				<sup>2/</sup>
(Program Direction)	( )	( )	( )	( )
(Training)	( )	( )	( )	( )
<u>Other</u>				
TOTAL	\$52,740	\$71,413	\$567,111	\$691,264

Number of individuals served which should be used to convert above figures to a per-capita basis. 25,125: Total per-capita annual operating cost: \$27.51.

- 1/ Transportation cost includes CARE general administration. External transport (ocean freight) is included in costs for food.
- 2/ CARE general administration is included under item for transportation. It is not clear whether Colombia Applied Nutrition Program technical inputs are included also.
- 3/ The local workers (administrator and 2 cook helpers) are supported from a rotating fund administered by CARE at the Department level and based on service charges paid by recipients. In addition, many municipalities have budgeted funds for augmenting the salaries of local workers.

# B. Cost of Physical Structure and Equipment

	: Central : and : Department: : Government:	: Local : community	: External : donor	: Total
Total All Feeding Programs	: \$102,300	: \$126,000	: \$63,900	: \$292,200

# C. Annual Costs Including Capital Depreciation, Interest on Investment, and Maintenance

	: Total	: Central : and : Department: : Government:	: Local : community : or : individual:	: External : donor
Total Operating Cost (from IV "A" above)	: \$691,264	: \$52,740	: \$71,413	: \$567,111
Total of:*				
(Depreciation)	: (\$29,220)	: (\$10,230)	: (\$12,600)	: (\$6,390)
(Interest)	: (\$29,220)	: (\$10,230)	: (\$12,600)	: (\$6,390)
(Maintenance)	: ( )	: ( )	: ( )	: ( )
Total Annual Costs	: \$749,707	: \$73,200	: \$96,613	: \$579,891
Total Per-capita Annual Costs	: \$29.84	: \$2.91	: \$3.85	: \$23.08

\*Estimates not available. 10% of capital investment is used for depreciation and 10% for interest. Maintenance is believed covered under operating costs. (Note: CARE, which furnished the basic figures (1), uses a different method of accounting in which capital cost is amortized over a 15 year period and interest is not included. Using the CARE means of computation, total per capita operating costs are \$28.29.)



D. Annual Per Capita Operating Costs Per Individual Actually in Need in Target Group Reached

Only those in need should be reached as indicated in III-c above.

E. Estimated Share of Costs of Program Which Can be Charged Off to Other Program Purposes

The present program is highly focused on nutrition. However as the nutrition centers also provide feeding for some school age children, some of the costs such as part of the and equipment expenditure should be charged to that program.





AppendixCOMPILER'S COMMENTS ON PROGRAMPotential Strengthes and Special Characteristics

Provision of a supplement on a daily basis ensures that the supplement is in fact consumed.

The nutrition centers are located in the most needy urban slums and rural communities.

Question Areas

The program does not reach children under 18 months. Geographic reach appears limited, and regular attendance is perhaps two thirds. It is not clear whether health center referrals identify all malnourished children.

CAUSES OF MALNOURISHED STATEA. Reasons for Food Deficiency

Information as to relative importance of income level or food availability, and lack of knowledge in contributing to dietary deficiencies not obtained.

B. Other Contribution CausesPrevalence of Disorders1. Extent of diarrhea

The ICMND survey team found in 1960 that out of 1,261 children examined 20% had diarrhea at the time of examination and 0% had experienced it in the month prior to examination. Highest prevalence was in the 0-4 age group. (5)

2. Extent of Parasitic Infection

Parasitic infestation was almost always present in the sample referred to above. (5)

### 3. Prevalence of Disease Effecting Children

Prevalence of respiratory infection ranged from 22% to 44% in the 0-5 age group. (5)

## PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSION

### A. Present Coverage of Program Type

Bully feeding is one of the most common approaches; coverage extent not obtained.

### B. Mechanisms Presently Available for Implementing Program Type

#### 1. Existing Institutions

Program has in past made some use of existing school auditoriums, etc., but now constructs special centers. (3)

#### 2. Local Resources

The local community contributes approximately 11% of the total program costs (including capital amortization) and 62% of the program costs less PL 480 food and ocean freight.

The local workers (administrator and two cook helpers) are supported from a rotating fund administered by CARE at the Department level and based on service charges paid by recipients. In addition many municipalities have budgeted funds for augmenting the salaries of local workers.

#### 3. Local Manpower Source

An administrator and two cook helpers run each center. Although information has not been obtained, presumably at the least the cook helpers are locally recruited.

COMPUTATION OF PROTEIN REQUIREMENTS (from page 5)

Protein requirements computed as follows:

Average weight Colombian male 4 yrs. old = 13.3 kg.  
(Source ICNND Survey Colombia, 1961)

Adequate protein intake for 4-6 yr. old.  
on basis of  $\text{NPU} = 60$  = 1.61 g/kg.

$$13.3 \times 1.61 = 21.4$$

Source of Information

1. Communications, March 8, April 1, 8, 1972 - R. Montee (CARE) to compiler.
2. CARE - Program Plan for Colombia - FY 1973.
3. Checchi and Company - Food for Peace - An Evaluation of PL 480 Title II, 1972.
4. WFP Intergovernmental Committee - Interim Evaluation Report - Colombia - Doc. WFP/IGC; 21/10 Add. 5, March 24, 1972.
5. Interdepartmental Committee on Nutrition for National Defense, Colombia Nutrition Survey May-August 1960: Washington, 1961.

TYPE: Daily FeedingEXAMPLE: Existing Facilities - India ("Children's Charter")Purpose:

To supplement the diet of pre-school children and pregnant and lactating women.

Delivery System:

Food is provided daily at existing village facilities, schools, day care centers, etc.

Target Group Reached:

Age: To date: mainly children 4-6 years.

Target: 0-6 years plus pregnant and lactating women

Location: Rural and urban areas

Impact:

Program appears to meet protein needs, but not clear whether provides sufficient calories.

Program appears capable of reaching population in all locations but to date appears limited to older pre-school children.

Contribution to Other Programs:

Not directly applicable.

Annual Per Capita Cost:

Per individual reached: \$8

Per individual in need: Information not obtained, might be \$16

Who Pays: Mainly central government - breakdown not obtained

## I. DESCRIPTION OF PROGRAM

### A. Purpose, Services Delivered, Method of Delivery

Under India's "Children's Charter" a special feeding program has been launched which has the objective of improving the nutrition of pre-school children 0-6 years and pregnant and lactating women.

A food supplement is provided on a daily basis for approximately 250 feeding days per year. The major part of the recipients are children age 4-6 as problems have been encountered in getting attendance of younger children at a feeding point on a daily basis.

The program utilizes existing **infrastructure** and existing personnel. These include teachers, day care center attendants, social workers, and private Indian voluntary agency personnel. Local facilities such as school meeting houses, etc. are used. (Health posts are also used to some extent when available). The program does make provision for payment of a stipend for these workers of \$4 per year.

### B. Administrative Organization and Personnel

#### Auxilliary

Teachers, day care center attendants, social workers, and Indian voluntary agency personnel are utilized as cited above.

#### Technician/Supervisor

These personnel are under the supervision of the normal State block level administrative mechanism.

### Higher Level Supervision and Administration

The program is under the Federal Government Department of Social Welfare. Responsibility for organization and running of specific programs falls to the State Governments. CARE is currently assisting with the administration of many of these programs. (Programs in which CARE participates reach perhaps 50% of the total number of recipients in the program).

## II. WHO PROGRAM REACHES

### A. Numbers Served:

In rural areas each center is estimated to service around 50 children as a rough approximation.

It is estimated that approximately one million children are currently being reached.

### B. Qualifications for Participating in the Program

#### 1. Location

The program operates in both rural and urban areas.

#### 2. Age Range of Vulnerable Group Members Included in Program

The target of the program is children 0-6 and pregnant and lactating women. As indicated in I. above, the major part of the recipients are the children age 4-6.

#### 3. Socio-economic Status

The program is open to all groups with emphasis put on reaching the lower income segments.

#### 4. Institutional Participation

It is necessary to make a daily visit to some type of feeding center or station located in the village.

#### 5. Other Factors Affecting Participation

Mothers do not normally come to the feeding center. The older children 4-6, who can walk, come, often escorted by an older sibling. An effective radius of 2-3 kilometers is estimated.

#### C. Estimate of Coverage Program Potentially Capable of Providing

The program appears capable of reaching a substantial number of the older pre-school children. As presently constituted its ability to reach younger children and pregnant and lactating women appears limited.

### III. EFFECTIVENESS OF PROGRAM

#### A. Supplement

The type of supplement used varies. For example, for approximately 400,000 recipients CSM and oil or soy fortified bulgar are used. For another 200,000 a combination of milk powder, oil and high protein Modern Bread is used.

#### Source or Sources of Food Used

Some of the food is provided through PL 480 donations. In other cases the food is locally produced and processed as, for example, where Modern Bread is used.

#### B. Extent Supplement Meets Deficiencies

#### Judgement and Narrative Comment

The program would appear to provide adequate protein to meet deficiencies. Provision of calories would depend in part on



whether the food provided is used to supplement for a normal meal or to add to it. As a substitute for a normal meal the addition of 300 calories would not appear adequate.

#### Intake and Other Information

Nutrient	: Dietary : : allowance : : used <u>1/</u> :	: Normal : : intake :	: Deficiency : :	: Addition : : to diet : : (supplement, : : etc.) :	: Percent : : of : : deficiency : : met :
	: <u>1/</u> :	: <u>2/</u> :	:	:	: Met
Protein	: 22 g. :	: 20 g. :	: 2 g. :	: 12 g. :	: with
	: <u>1/</u> :	: <u>2/</u> :	:	:	: overage
Calories	: 1500 :	: 1000 :	: 500 :	: 300 :	: 60%
	:	:	:	:	:

1/ Source - Indian Council of Medical Research - 1968.

2/ Source - Data from Punjab (2).

#### C. Percentage of Those Reached Estimated to Actually Have Significant Deficiency

Information has not been obtained. On the basis of data taken from Punjab for younger children, 50% are estimated as suffering from malnutrition.

#### D. Clinical or Other Evaluations

Information as to whether evaluation have been undertaken has been obtained.

### IV. CONTRIBUTION TO OTHER PROGRAMS

Program is focused on improving nutritional status.

V. PROGRAM COSTSA. Annual Per Capita Operating Cost

(A conversion rate of 7.5 rupees to the U.S. dollar is used)

	:	Central	:	Local	:	External	:	Total
	:	government	:	community	:	donor	:	
	:		:	or	:		:	
	:		:	individual	:		:	
<u>Food</u>	:		:		:		:	\$6
(Raw materials)	:	( )	:	( )	:	( )	:	( )
(Processing)	:	( )	:	( )	:	( )	:	( )
<u>Transportation to Site</u>	:		:		:		:	
(includes handling and storage)	:		:		:		:	\$.66
(Within country)	:	( )	:	( )	:	( )	:	(\$ .66 )
(External)	:	( )	:	( )	:	( )	:	( NA )
	:	\$1.16	:		:		:	\$1.16
<u>Provision of Services at site</u>	:	(includes ad-	:		:		:	(includes ad-
	:	ministration)	:		:		:	ministration)
(Operating personnel)	:	( )	:	( )	:	( )	:	( )
(Recurring Materiel costs)	:	( )	:	( )	:	( )	:	( )
<u>Motivation</u>	:		:		:		:	
Costs - if applicable,	:		:		:		:	
to get consumers to	:		:		:		:	
accept food or other-	:		:		:		:	
wise participate in	:		:		:		:	
program	:		:		:		:	
<u>Administration</u>	:	included in	:		:		:	included in
	:	services	:		:		:	services
	:	above	:		:		:	above
(Program direction)	:		:		:		:	
(Training)	:		:		:		:	
<u>Other</u>	:		:		:		:	
	:		:		:		:	
<u>Total</u>	:	\$7.82	:		:		:	\$7.82

Total per capita operating cost 7.82 (Note: this is based on 250 feeding days/year).

## B. Discussion

The figures provided in the table above are costs allocated for the program by the Indian Government which is done on a per capita basis. Costs used are for a locally produced food.

Existing facilities are utilized, and no additional cost for interest, maintenance and depreciation is included here.

### C. If applicable, Annual Per Capita Operating Costs Per Individual Actually in Need in Target Group Reached

Information has not been obtained. If 50% of those served are in need, per capita costs would be about \$16.

### D. If applicable, Estimated Share of Costs of Program Which Can Be Charged Off to Other Program Purposes

Program is focused on improving nutritional status.



## APPENDIX

### COMPILER'S COMMENTS

#### Potential Strengths and Special Characteristics

The program makes use of existing personnel using the technique of provision of a stipend for the additional work required.

Use of teachers and schools provides a means of capitalizing on the sole infrastructure that extends throughout the rural area.

Daily feeding ensures consumption by the recipient.

#### Question Areas

The program appears to be reaching mainly the older pre-school children. (The Naranwal program described elsewhere in this compendium uses a similar approach but does reach the young children. Accordingly the reason why this program does not reach this group is not entirely clear).

Calories may not be sufficient to meet deficiencies.

### PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSION

#### A. Present Coverage of Program Type (Worldwide)

Daily feeding is an approach used quite commonly. Information on extent of use not obtained.

#### B. Mechanisms Presently Available for Implementing Program Type

##### 1. Existing Institutions

The program relies on facilities already in place. This includes schools which are located throughout the rural areas.

##### 2. Local Resources (Excluding Personnel)

Information not obtained.

### 3. Local Manpower Source

As described in I. of the main text, personnel already in place in the villages or assigned to them are used for line execution of the program.

Source of Information

1. Annual Plan 1972-73. Government of India Planning Commission, 1972.
2. Interviews. August, September, 1972.
3. Taylor, C., Desweemer, C., Urberoi, J., Kielman, A., List, M. Malnutrition and Infection in Weaning-Age Punjab Children - Naranwal Rural Health Research Center - Progress Report 1971, Baltimore, Maryland, 1972.





TYPE: Daily Feeding

EXAMPLE: Feeding and Nutrition Education - India (under APN)

Purpose:

To improve the nutritional status of pre-school children and pregnant and lactating women via supplementation and education.

Delivery System:

Daily supplement is provided. Mothers also receive nutrition education.

Target Group Reached:

Age: 2½ - 5½ years; plus pregnant and lactating women.

Location: Villages in rural areas.

Impact:

Significant improvement of pre-school children and of birth weights of infants.

Extent of reach of program to all individuals in rural area not determined.

Contribution to Other Programs:

Not directly applicable.

Annual Per Capita Cost: (Computed for pre-school children only not women; higher level supervision costs not included)

Per individual reached: \$16

Per individual in need: Not determined whether figures would be the same.

Who Pays: Central Government \$3; Local community \$5; External Donor \$8.

## I. DESCRIPTION OF PROGRAM

### A. Purpose, Services Delivered, Method of Delivery

The purpose of the program is to improve the nutritional status of pre-school children and pregnant and lactating women. Supplementary feeding is provided on a daily basis for both vulnerable groups. In addition, instruction is given in the selection, preparation and production of nutritious foods and in the cultivation of home gardens. 1/

### B. Administrative Organization and Personnel

#### Auxilliary

A woman (Balasevika) provides the point of contact with children and mothers. She receives elementary training and is paid about \$5/month. In the example costed, here she would handle 50 children. This number may be less in other instances. The Balasevika has an assistant who receives about \$1.30/month.

#### Technician/Supervisor

The line personnel described above fall under the supervision of community development officers with responsibilities broader than nutrition. These officers are:

1. Lady worker covering five to ten villages (Gramasevika). Her duties include supervision of women's programs in general. She is given a two year training course and a special 10 day course on applied nutrition.

---

1/ Information obtained does not indicate specific mode of food delivery. Activities of the Applied Nutrition Program include day care centers. However in this case the supplement does not appear adequate for a scheme where the child resides at a center for a significant portion of the day.

2. A lady worker at the block level (Mukhyasevika). She is in charge of women's programs for the block. Her duties include visits to 10 to 30 pre-school programs each month. She also receives two years of training and a special 10 day course on applied nutrition.

### Higher Level Supervision and Administration

A Panchayat Union Commissioner is in charge of each block and is supposed to make occasional visits to pre-school programs.

A District Women's Welfare Officer has responsibility for the women's programs in the district covering 42 blocks.

In the area from which the sample was taken, staff of a training center for home science also visit pre-school programs.

## II. WHO PROGRAM REACHES

### A. Numbers Served:

About 30 to 50 pre-school, and eligible pregnant and lactating women (22 in the instance evaluated).

### B. Qualifications for Participating in the Program

#### 1. Location

The program is located in rural villages.

#### 2. Age Range of Vulnerable Group Members Included in Program

Children 2½ years to 5½ years, and pregnant and lactating women.

#### 3. Socio-economic Status

The program is reported available for all. Information was not obtained as to whether payment of three paise per child per day (or about \$1.20 per year) is required for all participants, and, if so, whether this constitutes a bar for any group.

#### 4. Institutional Participation

Participation of children in program requires attendance at a village center. Information was not obtained as to whether such centers are within the physical reach of the total population.

#### 5. Other Factors Affecting Participation

The following are considered problems affecting participation, (Information on degree of influence was not obtained): (1) ignorance about the program, (2) low income background, (3) social prestige, (4) lack of interest, and (5) lack of time.

#### C. Estimate of Coverage Program Potentially Capable of Providing

The program would not appear capable of providing supplements to children below two years. It is possible, however, that the nutrition education component would have an effect on this group. Information was not obtained as to the ability of mothers and children to come to the center.

### III. EFFECTIVENESS OF PROGRAM

#### A. Supplement

##### Composition:

Pre-school: 28.4 g. skim milk daily; boiled egg twice weekly.

Expectant women: 46.2 g. skim milk daily; boiled egg alternative days

Nursing mother: 43 g. skim milk daily, boiled egg 3 times per week.

##### Source or Sources of Food Used

Milk is provided by CARE or CASA. Egg comes from local community.

B. Extent Supplement Meets DeficienciesJudgement and Narrative Comment

With the addition of the supplement to the home diet, about 2/3 of the caloric allowance is met for pre-school children and for expectant women. The nursing women in the sample had a considerably lower caloric intake; and with the supplement 50% of allowance was met.

Intake and Other InformationPre-school Children

Nutrient	: Dietary : allowance : used <u>1/</u> :	: Normal : intake :	: Deficiency :	: Addition : to diet : (supplement, : etc.) :	: Percentage : of : allowance : met :
Protein	: <u>1/</u> : 22 g. :	: <u>3/</u> : 31 g. :	: 0 :	: 11 g. :	: -- :
Calories	: <u>2/</u> : 1500 :	: <u>4/</u> : 919 :	: 581 :	: 123 :	: 69% :
Iron	: 15-20 mg. :	: 13 mg. :	: 2-7 mg. :	: 1 mg. :	: 70-93% :

1/ Source ICMR 1971.      3/ Source: Devadas Presentation IX Congress Nutrition.

2/ Source ICMR 1971.      4/ Source: Devadas Presentation IX Congress Nutrition.

Expectant Women

Nutrient	: Dietary : allowance : used <u>1/</u> :	: Normal : intake :	: Deficiency :	: Addition : to diet : (supplement, : etc.) :	: Percentage : of : allowance : met :
Protein	: <u>1/</u> : 55 g. :	: <u>3/</u> : 51 g. :	: 4 g. :	: 20 g. :	: Total with : large over- : age :
Calories	: <u>2/</u> : 3300 :	: <u>4/</u> : 1913 :	: 1387 :	: 203 :	: 64% :
Iron	: 40 mg. :	: 29 mg. :	: 11 mg. :	: 1 mg. :	: 75% :

See footnotes above.

Nursing Women

Nutrient	Dietary allowance used <u>1/</u>	Normal intake	Deficiency	Addition to diet (supplement, etc.)	Percentage of allowance met
Protein	<u>1/</u> 65 g.	<u>3/</u> 35 g.	30 g.	19 g.	83%
Calories	<u>2/</u> 2900	<u>4/</u> 1325	1575	190	49%
Iron	30 mg.	33 mg.	--	1 mg.	Not applicable

See footnotes above.

C. Percentage of Those Reached Estimated to Actually Have Significant Deficiency

Information not obtained.

D. Clinical or Other Evaluations

Pre-school Children:

Over 6 month test period average weight increased 1.34 kg. as compared to a control of .68 kg. Height increased 4.04 cm. as compared to control of 1.78 cm. Hemoglobin improved 1.53 g./100 ml. against a control of 0.68 g/100 ml. Clinical signs decreased from 45-50% incidence to 13-15%.

Expectant Women:

Weight increase was significantly higher than control; hemoglobin level was slightly higher - anemia decreased from 100% to 90%. Mean birth weight of infants born to test group was 2.68 kg. as compared to 2.22 kg. for the control group.

Nursing Women:

Weight decreased for both test group and control but less for test group. Hemoglobin level increased significantly for the test group. Changes in length and weight of test and control group children was as follows:

	<u>Length</u>		<u>Weight</u>	
	<u>Initial</u>	<u>Final</u>	<u>Initial</u>	<u>Final</u>
ANP	60.63	71.29	5.96	7.58
Non-ANP	60.17	69.29	5.47	6.88

However, despite these differences, analysis of the breast milk constituents in each group showed no difference.

Some changes in food selection and preparation by the mother were also observed.

IV. CONTRIBUTION TO OTHER PROGRAMS

Program concentrates on diet. However, nutrition education presumably has a more general health education component. (In programs where a day care center is used the contribution to pre-school education would be substantial - see also footnote 1, page 1).



V. PROGRAM COSTS (Note: Costs do not include supplements or instruction for women)

A. Annual Operating Cost Per Service Unit

	: Central	: Local	: External	: Total
	: government:	: community	: donor	
	: or	: individual:		
Food	:	:	\$336	\$336 <u>1/</u>
(Raw materials)	: ( )	: ( )	: ( )	: ( )
(Processing)	: ( )	: ( )	: ( )	: ( )
Transportation to Site	:	:	:	:
(includes handling & storage	:	:	\$41	\$41 <u>1/</u>
(Within country)	: ( )	: ( )	: ( )	: ( <u>2/</u> )
(External)	: ( )	: ( )	: ( \$41 )	: ( \$41 )
Provision of Services at Site	: \$69	: \$57	:	: \$126
(Operating personnel)	: ( )	: ( )	: ( )	: ( )
(Recurring material costs)	: ( )	: ( )	: ( )	: ( )
Motivation	:	:	:	:
Costs - if applicable, to get	:	:	:	:
consumers to accept food or	:	:	:	:
otherwise participate in	:	:	:	:
program	:	:	:	:
Administration	:	:	:	: <u>3/</u>
(Program direction)	:	:	:	:
(Training)	:	:	:	:
Other	:	:	:	:
TOTAL	: \$69	: \$57	: \$377	: \$503

Number of individuals served which should be used to convert above figures to a per capita basis 50. Total per capita operating cost \$10.

1/ Cost calculation contained in the appendix.

2/ Not obtained.

3/ Program guidance by community development personnel with responsibilities broader than applied nutrition. Information as to share of their salaries which should be attributed to supervision of this program was not obtained.



B. Cost of Physical Structure and Equipment

	:	:	:	:
	:	Central	Local	External
	:	government	community	donor
	:	:	:	:
Per unit	:	:	:	:
Center	:	500	500	\$1,000
	:	:	:	:
	:	:	:	:

C. Annual Costs Including Capital Depreciation, Interest on Investment, and Maintenance

	:	:	:	:
	:	Total	Central	Local
	:	:	government	community
	:	:	:	or
	:	:	:	individual:
Total Operating Cost (from IV "A" above)	:	\$503	\$69	\$57
	:	:	:	:
Total of:*	:	\$300	:	:
(Depreciation)	:	( 100 )	( 50 )	( 50 )
(Interest)	:	( 100 )	( 50 )	( 50 )
(Maintenance)	:	( 100 )	( )	( 100 )
	:	:	:	:
Total Annual Costs	:	\$803	\$169	\$257
	:	:	:	:
Total Per-capita annual Costs	:	\$16.06	\$3.38	\$5.14
	:	:	:	:

\*Estimates not available, 10% of capital investment is used for each sub-item.

D. If applicable, Annual Per Capita Operating Costs Per Individual  
Actually in Need in Target Group Reached

Information not obtained.

E. If applicable, Estimated Share of Costs of Program Which Can Be  
Charged Off to Other Program Purposes

Not applicable. Program's sole purpose is nutrition.



## APPENDIX

COMPILER'S COMMENTSPotential Strengthes and Special Characteristics

Of particular interest is the impact of the program on birth weights of infants born to pregnant women receiving supplements. (Assumming a correlation exists between birth weight and subsequent nutritional status, this short-term intervention may have very great benefits).

The program also shows significant impact on the status of pre-school children who receive the supplement. The supplement, however, provides only a small amount of calories which are the principle deficit. Accordingly, the improvement would appear either due to nutrition education or to some other factor that has not been identified.

Question Areas

The program does not reach children below two years. It is not clear whether or not all families needing assistance actually participate. Information was not obtained on whether the program is for all children regardless of need.

COSTS-CALCULATION FOR FOOD

28.4 g of milk per child/day (supplied by CARE or CASA) =

8.5 kg./yr or 18.7 lbs.

18.7 lbs. at 36¢/lb = \$6.73/child

\$6.73/child x 50 children = \$336

Supply of boiled egg twice weekly attributed to general expenses of running center.

Transportation

Ocean frieght 18.7 lbs. x 4.4¢/lb = \$.82/child

\$.82 x 50 children = \$41.00

Source of Information

1. Devadas, R. P. "Impact of An Applied Nutrition Programme on Nutritionally Vulnerable Groups of People" presented at IX International Congress of Nutrition, Mexico City, September 2nd through 9th, 1972.
2. Kamalanathen, G., Vice Principal, SRI Avinashilingan Home Science College, communication to compiler, September 1972.

TYPE: Day Care Center

EXAMPLE: Village Program - Thailand

Purpose:

To supplement the pre-school child's diet, also to control childhood disease and promote intellectual development.

Delivery System:

Children attend day care center where food supplement provided, also educational activities and health surveillance and immunization.

Target Group Reached:

Age: 2 - 5

Location: Villages in rural areas

Impact:

Program appears to improve nutritional status, and can reach children in rural areas.

The program does not serve children below two years, and does not, presently, cover all of lowest income group.

Contribution to Other Programs:

The program contributes in a major way to education and to health goals.

Annual Per Capita Cost:

Per Individual reached: \$34

Per individual in need: data not obtained but more than above

Who Pays: Government: \$24; Local Community \$10

## I. DESCRIPTION OF PROGRAM

### A. Purpose, Services Delivered, Method of Delivery

The primary objective of this program is to supplement the pre-school child's daily diet with a sufficient amount of protein rich foods and sources of calories. In addition, other objectives are control of childhood diseases by early detection, treatment and immunization, and training the child socially and promoting his intellectual growth and mental development.

The pre-school children are brought to centers in rural villages on a daily basis. Most centers keep hours similar to local schools. The center is supervised by a local girl provided special training.

The parents provide a box lunch for each child to which the center adds a supplement.

The daily routine includes activities such as oral reading, group play and games and the practice of good manners.

The children are observed for early signs of illness, and immunizations and periodic physical examinations are provided. Special measures are taken to ensure satisfactory conditions of environmental sanitation, including water supply, at the center.

A fee is charged for attendance at the center on the basis of ability to pay.

In some cases an informal social gathering is arranged for mothers once or twice a month into which health education, demonstration and practice are incorporated.

The center itself consists of four main areas: (1) for rest, (2) for cooking and food storage, (3) for play and (4) bath and toilet area.

The center is constructed out of mainly local material with labor supplied by the community.

To help build support for the program and to keep track of vital selected family statistics a village communicator system is being tested. Through interviews a communication map of the village is made which identifies what women other women talk to. From this map a small group of women are identified who receive most contact from other women. These women are given the task of reporting on health status, births, etc., each for a selected area of the village.

## B. Administrative Organization and Personnel

### Auxilliary

The day care center attendant is a village girl. The children under her supervision are limited to about 30. If necessary, a second attendant may be provided. The attendant is given short-term training in kindergarten, nutrition, health care and first aid treatment.

### Technician/Supervisor

The day care center attendant is under the immediate supervision of the midwife who mans the village health center. (The day care center is located near the health center.) The midwife, inturn, has call on other health services when needed for the children.

### Higher Level Supervision and Administration

Information on higher level supervision not obtained.

## II. WHO PROGRAM REACHES

### A. Numbers Served:

In a village of medium size (less than 1,000) children attending will be 30 to 60.

### B. Qualifications for Participating in the Program

#### 1. Location

The centers are located in villages in rural areas.

#### 2. Age Range of Vulnerable Group Members Included in Program

Age of children range from 2 to 5 (service provided mothers is limited to an informal social gathering once or twice a month with some education and demonstration incorporated into it.)

#### 3. Socio-economic Status

Attendance is on a fee basis adjusted to ability to pay. However, the costs of the center are such that the contribution from the better-off is not sufficient to cover costs of all of the members in the lowest income group, who can afford very little. Accordingly, only part of the lowest income group participates at the present time. (It is believed that the proportion of the lowest income group attending will increase).

#### 4. Institutional Participation

Individuals served are those who participate in day care centers. Some limitation on participation due to income (as indicated above) does obtain.

#### 5. Other Factors Affecting Participation

The program is reported to be accepted enthusiastically by the community. This is evidenced in community contributions such as for construction of day care centers.



C. Estimate of Coverage Program Potentially Capable of Providing

The program appears capable of general operation in rural areas. However, factors limiting depth of coverage are: (1) children below two years not included, (2) program is not presently capable of covering all families in lowest income group.

III. EFFECTIVENESS OF PROGRAM

A. Supplement

Composition

The supplement, a side dish of meat or fish or processed foods, is provided to be consumed in conjunction with a box lunch provided by the parents. The box lunch consists of such foods as rice and vegetables. The supplement provides approximately eight grams of protein.

Source or Sources of Food Used

Complete information on the source of the supplement has not been obtained but it is probably usually purchased on the local market.

B. Extent Supplement Meets Deficiencies

Supplement meets protein deficiency. Approximately one third of the caloric allowance is provided. In view of the fact that the food provided constitutes one meal or presumably at least one third of total intake, it would not appear that sufficient calories are provided to make up for deficiencies should they exist.

Intake and Other Information

Nutrient	Dietary allowance used <u>1/</u>	Normal intake	Deficiency	Addition to diet (supplement, etc.)	Percent of deficiency met
Protein	<u>1/</u> 20 g.	<u>3/</u> 12 g.	8 g.	8 g. (supplement) 4 g. (box lunch)	Deficiency met with 50% overage
Calories	<u>2/</u> 1300-1700	<u>4/</u>		500 supplement and lunch	Meets 30% - 39% of allowance

1/ Source: Program planners; original source not obtained.

2/ Source: FAO 1967 Standards.

3/ Represents home diet exclusive of lunch provided at center.

4/ Not obtained.

C. Percentage of Those Reached Estimated to Actually Have Significant Deficiency

An estimate of those in need was not obtained. However, it should be noted that the program does not select that segment of the population particularly suffering from malnutrition. And access by low income groups is limited, as described.

D. Clinical or Other Evaluations

Anthropometric measurements were made over a one year period on children attending two centers in different areas and on controls for each area. The differences in height and weight gain, which were obtained by multiplying average monthly gains by 12, are listed below:

	<u>Difference in year</u>	<u>Ubol</u>	<u>Chiergmai</u>
Height		1.4 cm. above control	3.1 cm. above control
Weight		.6 kg above control	.08 cm. less than control

Information as to possible reason for difference in results in two test areas was not obtained.

#### IV. CONTRIBUTION TO OTHER PROGRAMS

##### Health:

The program provides continuing health surveillance, periodic examinations and immunizations. This is undertaken with some assistance from the health center. (Satisfactory conditions of environmental sanitation, including safe water are provided for at the day care center.)

##### Education:

The daily routine includes activities such as oral readings, group play and games, and the practice of good manners for the purpose of training the child socially and promoting his intellectual growth and mental well-being.

V. PROGRAM COSTSA. Annual Operating Cost Per Service Unit

	Central Government	Local Community or Individual	External Donor	Total
<u>Food</u>	\$900	\$360 <sup>1/</sup>		\$1260 <sup>1/</sup>
(Raw Materials)	( )	( )	( )	( )
(Processing)	( )	( )	( )	( )
<u>Transportation to Site</u>				Information not
(includes handling & storage)				obtained but
				probably not
				applicable.
(Within Country)	( )	( )	( )	( )
(External)	( )	( )	( )	( )
<u>Provision of Services</u>				
<u>at Site</u>	\$360			\$360
(Operating Personnel)	(\$360)	( )	( )	\$360 )
(Recurring Material Costs)	( )	( )	( )	( )
<u>Motivation</u>				
Costs - if applicable, to get consumers to accept food or otherwise participate in program				
<u>Administration</u>				Not included
(Program Direction)	( )	( )	( )	( )
(Training)	( )	( )	( )	( )
<u>Other</u>				
TOTAL	\$260	\$360		\$1620

Number of individuals served which should be used to convert above figures to a per capita basis. 60

Total per capita operating cost \$27.00

<sup>1/</sup> Includes some miscellaneous expenses.

### B. Cost of Physical Structure and Equipment

	Government	Local community	External Donor	Total
Per unit				
For one village	\$750	\$500	\$50	\$1,300

### C. Annual Costs Including Capital Depreciation, Interest on Investment, and Maintenance

	Total	Central Government	Local Community or Individual	External Donor
<u>Total Operating Cost</u> (from IV "A" above)	1620	1260	360	
<u>Total of: 1/</u>	390	160	230	
(Depreciation)	( 130 )	( 80 )	( 50 )	( )
(Interest)	( 130 )	( 80 )	( 50 )	( )
(Maintenance)	( 130 )	( )	( 130 )	( )
<b>TOTAL ANNUAL COSTS</b>	<b>2010<sup>2/</sup></b>	<b>1420</b>	<b>590</b>	
<b>Total Per-Capita Annual Costs</b>	<b>\$33.50<sup>2/</sup></b>	<b>\$23.67</b>	<b>9.84</b>	

1/ Estimates not available, 10% of capital investment is used for each main item.

2/ Does not include administration. Addition is presumably relatively small.

D. If applicable, Annual Per Capita Operating Costs Per Individual  
Actually in Need in Target Group Reached

Information not obtained. But, as the entire pre-school population is eligible, costs per child in need would be considerably higher.

E. If applicable, Estimated Share of Costs of Program Which Can Be  
Charged Off to Other Program Purposes

No estimate obtained; however, program does have both health and education component.

APPENDIXCOMPILER'S COMMENTSPotential Strengthes and Other Characteristics

Particular strengthes of this program are the continuous care provided and the extent of community partipation. The program is reported to have generated significant enthusiasm among the communities served.

The village communicator system, described in I. - Description of Program, holds out promise as a technique for including the local populace that could have wide application. (Under another project in Thailand, not described in this compendium, an effort is being made to use these communicators for referral and provision of nutrition education, as well as reporting).

Question Areas

The coverage is not complete, particularly for lowest income groups. The extent to which the reported trend toward increased coverage of this group continues will be highly significant. The program does not reach children below age two.

It should also be noted that extension of the program is tied to existence of health centers which provide the supervisory midwife.

PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSIONA. Present Coverage of Program Type (Worldwide)

Worldwide information on the extent to which the day care center approach is used has not been obtained. Other countries where it is known that this approach is being used are Ghana, where 28,000 children are currently being covered by 400 centers, and India.



B. Mechanisms Presently Available for Implementing Program Type

1. Existing Institutions

The principle institutional mechanism already in place which the program makes use of is the village health center and midwife. The midwife supervises the running of the center by the attendant and acts as a health resource. The health center is not available in all villages.

2. Local Resources (Excluding Personnel)

Part of the costs for operation of the center (including provision of part of the food) is born by the local community - 22%. Part of the construction of the center is likewise so carried - 30%.

3. Local Manpower Source

The line operating person is the village girl, who is provided some training and a salary.



Source of Information

1. Nondasuta, A., "Some Newer Community Approaches", presented at Symposium on Young Child Nutrition Programs: Evaluation and Guidelines, Zagreb, Yugoslavia, 1971, in press.
2. Nondasuta, A. Interview - May, 1972.



TYPE: Mothercraft/Nutrition Rehabilitation

EXAMPLE: Mothercraft Program - Haiti

Purpose:

To rehabilitate malnourished children and provide nutrition education for their mothers.

Delivery System:

Children fed daily at centers for limited time period. Mothers provided nutrition education.

Target Group Reached:

Age: 2-5 years; also instruction for the mother

Location: Rural and urban

Impact:

Improves status of children while attending center; long-term nutrition education impact on mother not clear.

Reaches children in rural areas down to two years. Effective radius of center may not be sufficient to cover all children.

Contribution to Other Programs:

Not directly applicable.

Annual Per Capita Cost:

Per individual reached: \$75 length stay 6 mo; \$50 length stay 4 mo.

Per individual in need: \$75 length stay 6 mo; \$50 length stay 4 mo.

(One-shot rehabilitation not comparable to annual feeding costs - see discussion next.)

## I. DESCRIPTION OF PROGRAM

### A. Purpose, Services Delivered, Method of Delivery

The purpose of the mothercraft center is several fold:

1. To recuperate or initiate recuperation of malnourished children.
2. To educate the mother in the selection, preparation and use of proper foods so as to maintain or improve good nutritional status in their children, both those attending the center and siblings.

Mothercraft centers are located in urban and rural areas. About 30 children selected from the community attend the center six days a week. Planned attendance time is about four months. However, children are often readmitted so that average length of stay in combined admissions is about six months. The most seriously malnourished children - third and second degree are given priority in selection.

The children are served two complete means and two light ones.

The center is often a peasant house. Placed next to it is a kitchen consisting of an elevated cooking platform under a shelter made with coconut tree leaves. There is also a little warehouse to keep food and a latrine.

### B. Administrative Organization and Personnel

#### Auxilliary

A young center director trained by the Bureau of Nutrition supervises the center with assistance from a cook. In the original pilot project, the supervisor was a local village girl.

The supervisors in the larger scale program usually come from the capital city. Every day several mothers stay at the kitchen. They help with the preparation of the food and are given explanation as to the value of certain foods and their preparation. In addition, there is supposed to be a formal nutrition education class held once a week for the mothers of all children participating in the center (4). About 30 children attend the center.

#### Technician/Supervisor

A staff of several persons, within the ministry of health, helps to supervise the program which covers about 56 centers. There is an individual with general nurse training who has full-time responsibility for program supervision.

#### Higher Level Supervision and Administration

A higher level doctor with broad responsibility within the ministry of health has overall responsibility for the program.

## II. WHO PROGRAM REACHES

### A. Numbers Served:

Thirty children are served by one delivery unit for a planned period of four months, which averages about six months in combined admissions.

There are approximately 56 centers in Haiti.

### B. Qualifications for Participating in the Program

#### 1. Location

The centers are located in urban and rural communities.

## 2. Age Range of Vulnerable Group Members Included in Program

Average age of children on admission was 3.2 years.

This was also about the median. Pregnant and lactating women are not provided supplements.(1).

In general, Nutrition Rehabilitation centers (or mothercraft in the case of Haiti) are considered to be limited to reaching children above two years unless additional and higher quality staff is utilized (7).

## 3. Socio-economic Status

Fee (when there was one) was usually \$.10/month.

Poorest children were not excluded (1).

## 4. Institutional Participation

Families must be within range of the mothercraft center. Information as to what constitutes effective range was not obtained, but it would appear that some families do live too far away to participate.

## 5. Other Factors Affecting Participation

A control group used in one evaluation consisted of children who had attended centers for a very brief period of time but then dropped out. This group was 23% of the number of those attending. One reason was probably distance from the center.(1).

## C. Estimate of Coverage Program Potentially Capable of Providing

The two most critical factors would appear to be age (most of the children are close to 3 years) and distance from the center. The program would, however, appear capable of reaching a substantial majority of the pre-school population within ages 2-5.

### III. EFFECTIVENESS OF PROGRAM

#### A. Supplement

##### 1. Composition

Two complete meals and two light ones are provided.

The objective is to use types of food that can be purchased locally. A typical supplement would be a combination of cereal and beans supplemented by milk and various vegetables, greens and fruits.

##### 2. Source or Sources of Food Used

Although food is of a type that can be purchased locally, it usually actually is purchased by the center supervisor in the capital city (8).

#### B. Extent Supplement Meets Deficiencies

##### 1. Judgement and Narrative Comment

Supplement is adequate to meet protein and calorie needs of younger children. However, the older children, over three, do not appear to receive adequate calories, if the assumption is made that center feeding constitutes their total food source, and the FAO standard is used. (Children attend from about 8:00 a.m. to 3:00 p.m.) Program evaluation by King et. al. (2) states that results, might have been more dramatic if more food was given, but that the objective was to keep the food budget equivalent to what a local family could afford, or about 9¢ per day.

2. Intake and Other Information

Nutriment	Dietary : Normal :			Addition to: diet (sup- plement, etc):	Percent of allowance met by supplement
	allowance used	intake	Deficiency		
				1/	meets total
Protein	Supplement	intended to		40g	requirements
	constitute	complete	diet	1,350 cal.	100% for 1-3 yr.
Calories					75% for 4-6 yr olds.

1/ - (4)-Fougere.

C. Percentage of Those Reached Estimated to Actually Have  
Significant Deficiency

Recipients are selected on basis of need so that almost all of those reached are supposed to have significant deficiency (4).

D. Clinical or Other Evaluations

Evidence as to whether the program is really successful in achieving its overall goals is conflicting.

Over the short term it is clear that children attending the centers for a four to five month period do improve as compared to a control group (in the same village). This is indicated both by a comparison of changes in weight-age (weight as a percent of expected weight for a standard child of the same sex and age) and by measures of blood protein and internal arm circumference. (1,2)

But over the longer term, the examination of two evaluations, by Beaudry-Darisme and Latham (1), and King et. al., (2) provide evidence both pro and con significant benefit. (For further discussion see Appendix.)

IV. CONTRIBUTION TO OTHER PROGRAMS

Mothercraft program in Haiti is solely nutrition.



V. PROGRAM COSTSA. Annual Operating Cost Per Child Served

The following is a breakdown of the cost of serving one child for an average period of 6.4 months. The figures should be considered in the context of the discussion which follows (section F).

	Central Government	Local Community or Individual	External Donor	Total
<u>Food</u>				23.00
(Raw Materials)	( )	( )	( )	( )
(Processing)	( )	( )	( )	( )
<u>Transportation to Site</u>				see other below
(includes handling & storage)				
(Within Country)	( )	( )	( )	( )
(External)	( )	( )	( )	( )
<u>Provision of Services at Site</u>				\$22.70
(Operating Personnel)	( )	( )	( )	(22.70)
(Recurring Material Costs)	( )	( )	( )	( )
<u>Motivation</u>				included in role of operat- ing personnel.
Costs - if applicable, to get consumers to accept food or other- wise participate in program				
<u>Administration</u>				13.89 <sup>1/</sup>
(Program Direction)	( )	( )	( )	(13.89)
(Training)	( )	( )	( )	( )
<u>Other - includes: center equipment, housing of supervisor, paper, medica- tions, transportation of food, other miscellaneous</u>				12.93
<b>TOTAL</b>				72.54

<sup>1/</sup> Includes program direction personnel and office furniture, jeep, etc.  
Purchase value of equipment is taken and amortized over a ten year period.

B. Cost of Physical Structure and Equipment

	Gov't	Local community	External Donor	Total
Per unit				
Estimated cost				
for rental of				
village, house for				\$180 <sup>1/</sup>
use as center				

<sup>1/</sup> King (5) (On annual per capita basis this would be \$3/child/year.

Computation: 30 children x center x 2 (assuming six month duration per child) = 60 children divided into \$180 = \$3.

C. Annual Costs Including Capital Depreciation, Interest on Investment, and Maintenance

	Total	Central Government	Local Community or Individual	External Donor
<u>Total Operating Cost</u> (from V "A" above)	72.54			
<u>Total of: *</u>	3.00			
(Depreciation)	( )	( )	( )	( )
(Interest)	( )	( )	( )	( )
(Maintenance)	( )	( )	( )	( )
TOTAL ANNUAL COSTS				
Total Per-Capita Annual Costs (can be filled in by USDA)	75.54			

D. Annual Costs Per Individual Actually in Need in Target Group Reached

Same as per capita costs - \$75.

E. Estimated Share of Costs of Program Which Can Be Charged Off to Other Program Purposes

Mothercraft program in Haiti is solely nutrition. (This is not true of many other nutrition rehabilitation programs.)

F. Discussion

Costs are presented in several ways. First, the preceding table contains calculations developed by the Beaudry-Darisme-Latham evaluation. The calculations are noted briefly in 1. below. Second, additional calculations are made as the program might run with certain increments of administration and food. Finally, in connection with these additional calculations a distinction between start-up and maintenance costs for this type of program is made.

1. Annual Operating Cost Per Individual Served by Center  
(Calculations from Beaudry-Darisme-Latham study)

The study found that the child was admitted on the average of 1.4 times, and that as a result the average length of stay in combined admissions was 6.4 months. Costs per day per child are computed at 37¢.

$37¢ \times \text{average length of stay } 6.4 \text{ mo.} = \$72.54$

plus rent of mothercraft facility of \$3.00 per year per child for a total of \$75.54 per recipient.

2. Annual Operating Cost Per Individual Served by Center  
Assuming Additional Administration Increments.

The following are rough estimates, based in part on discussions held with Dr. Beaudry-Darisme. Several sets of figures are presented. First, cost per child is provided. Second, start-up costs are calculated. These would be the costs of initially reducing malnutrition. Finally, maintenance costs are postulated which would be applied following an initial one year period.

a. Cost of Serving One Child

The objective of the changes postulated would be to reduce the average length of stay in the center from 6.4 months to 4 months and to improve the centers impact. To do this, additional supervisory staff and food would be added. This would result in the cost of serving a child increasing from 37¢/day to slightly over 40¢. Assuming a reduction in length of stay to the original planned period of four months, average cost per child served would be about \$50.

The calculations are contained in the appendix.

b. Start-up Costs

The start-up cost of the program are defined as the cost in the initial phase of the program of preventing the continuing malnourishment of children that would otherwise remain in this state.

In the case of Haiti, it is assumed that with the additional increments referred to above the total population of 67 children age two to five in each village would be reached in the first year. The cost per child has been calculated above as \$50.00.

### 3. Maintenance Costs

Maintenance costs of the program are defined as the continuing costs, once the program is established of preventing malnourishment using the original malnourished population as the base. Thus, in the case of Haiti, it is assumed that 67 children per village in the two to five age group would normally be malnourished. An effective program will reach these children at an annual start-up cost of \$50 per child per year. After the first year, it is assumed that 67 will have been reached. In the second year, and every year thereafter an additional 25% or 18 will become eligible for the program. In addition, it is postulated that there will be additional entries to the program, mainly from the group which was originally healthy. These additions are estimated at  $\frac{1}{3}$  of the base figure originally malnourished or 22. Total costs of serving the total number of eligibles will be  $\$50 \text{ per capita} \times 40 (18 + 22) = \$2,000$ . Per capita costs of improving the nutritional status of these children will be \$50 per child. But since this expenditure will be the total cost of maintaining a program in which 67 are protected, these costs should be divided by 67 to yield \$29.85.

Alternatively if, due to the impact of nutrition education, the number participating in the program can be limited to those becoming eligible due to age, 18, costs would be \$13.42. Or if nutrition education neared 100% effectiveness long-term maintenance could approach 0.

It should be noted that all of the figures provided are for for "reaching" children. In practice, however, these figures are low because a number less than those reached are found to improve significantly. In Haiti under the current program, the figure is 75% (1). It is believed that similar "slippage" occurs in other types of pre-school programs.

AppendixCOMPILER'S COMMENTS ON PROGRAM

Observation of this program (8) emphasizes the need for good administration in operational programs. It is possible that the return in benefits from an increased expenditure on supervisory/training staff may be extremely high.

Some observers believe that the absence of a health component severely limits the effectiveness of this program.

The program does not reach the 6 months to 24 months group.

CAUSES OF MALNOURISHED STATEA. Reasons for Food Deficiency

The frequency with which a child had fever during his stay in the center was found in the Beaudry-Darismé evaluation to be the single most important variable accounting for degree of change in weight-age (could account for 14% of the variance in change seen). The two other important variables were the frequency with which the child had diarrhea and effective stay. (In a companion evaluation of Guatemalan centers the role of infection and diarrhea was much less.) (1)

The economic feasibility of each family providing an adequate diet to its members was determined as 9¢ per person per day for diet which would require a minimum income of 20¢ per person per day. 66% of families had incomes below that necessary to meet minimum essential nutritional and health needs. (1)



## PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSION

### A. Present Coverage of Program Type

Mothercraft, or nutrition rehabilitation centers, using the principle of the several months feeding in conjunction with nutrition education of the mother, have been established in 16 countries.

The largest number of centers are in Colombia, Guatemala, and Haiti. Other countries with centers are: Algeria, Brazil, Bolivia, Costa Rica, Ecuador, India, Nigeria, Peru, Philippines, Tanzania, Uganda, Venezuela, and Rwanda. (In Costa Rica, Colombia, Uganda, Venezuela, and Tanzania, children live in (7).

### B. Mechanisms Presently Available for Implementing Program Type

#### 1. Existing Institutions

In Haiti the program makes use usually of very simple facilities such as a peasant home and a kitchen platform with inexpensive leaf roof. Accordingly, such facilities can be developed in almost any village.

#### 2. Local Resources

Community contribution varies, with a high estimated at about 50%.

#### 3. Local Manpower Source

The cook is usually recruited from the village. (The center supervisor is usually recruited from the capital city.)

## EVALUATION - FURTHER DISCUSSION

The following continues the discussion of evaluation in the main text.

Examples of evidence to support the theory that the centers have impact are:



1. Over a two year period (1964-66) children whose mothers had attended the center did better than matched controls in the same village. (2)

2. A change in weight-age between admission and one year after discharge was registered for the experimental group. Weight-age was 61.9 on admission and 66.1 at follow-up (1). (Informal observations of children on entering and leaving the center suggests that this change in weight for age was significant in terms of the true health status of the children (8).)

Examples of evidence which raises questions as to the impact of the centers are:

1. While the children maintained the gains made in weight-age while at the center, they did not continue to progress. Thus, weight-age at discharge was 66.3 and one year later 66.1. Further, gains in weight age of children who attended the center from admission to follow-up verses controls were not very great. (Experimental 61.9 to 66.1, control 58.6 to 60.9.) (1) While the change over the four to five month period may be significant, a question can be raised as to how significant the difference over the long-run is between experimental change in weight-age (4.2 lbs.) and control change in weight-age (2.3 lbs.) (1) However, the informal observation of improvement referred to above would suggest that the impact of the centers on nutritional health was real.

Several additional comments on the above should be made:

1. The findings described are complicated by the fact that it is not clear whether weight-age is a good measure (3). A child who had been malnourished might be small for his age but actually have sufficient weight for his height.

(Children of the elite in the capital city are reported to conform to U.S. standards.)

2. The Beaudry-Darisme and Latham study findings were generally corroborated in a companion element of their study on Guatemalan centers. (Actually in that case there was almost no difference in gains over the total period by experimental and control groups.) (1)

3. A study of incidence of disease in relation to impact of two centers showed a high correlation between debilitating disease and failure to improve nutritional status. (9)

4. The above does not constitute a review of all evaluations made.

Studies of nutrition knowledge acquired by the mothers is not clear. The Darisme Latham study found that the mean scores of mothers interviewed as to knowledge of nutrition and child feeding practices were not different between experimental and control groups when all centers were considered. However, knowledge was higher in some of the centers. Meat, fish, poultry, vegetables and fruit were reported consumed significantly more often by the experimental group. Differences in consumption of low cost pulses were not found. (Darisme and Latham believe that effective education would have been reflected in the progress of the children after leaving the center.) (1)

King et. als. compared a village with a center with one without and found a significant difference over time in food consumption trends. (2) (The influence of an agricultural project in the center village was not determined.) (3)

COSTS - FURTHER DISCUSSION

The Haiti mothercraft program has progressed from the pilot to operational phase. In the opinion of one observer (8), the program exhibits the problems of many other programs in the operational phase. Namely, the approach used successfully in the pilot phase is not as well executed in the more general application. To help remedy this situation, the following additional inputs are proposed (8):

1. An additional headquarters supervisor and assistant, together with a driver and jeep. These personnel would act as a roving team. They would provide spot-check supervision of center operations and additional follow-up instruction of local personnel. The team would also identify malnourished candidates for the centers through weighing of children in the villages.

Total costs would be:

Supervisor	12 x \$80/mo.	=	\$960
Assistant	" " "	=	960
Driver	12 x \$40/mo.	=	480
Jeep	\$5,000 (amortized over 10 yr. period)	=	500
Gas			750
			<u>\$3,650</u>

Per capita costs -

A survey of the status Haitian children in 24 rural villages found 1,190 classified as falling in second or third degree malnutrition on the basis of weight for age using Jamaican children as a standard (10). This is equivalent to about 50 children per village for the age

group one to three. Assuming a mothercraft program could reach children in the age-group two to five, the average number of children per village would be 67.

The present program has approximately 56 centers.  
 $56 \times 67 = 3,752$  target population.

Assuming full participation of these children, per capita costs of added administration would be  
 $\$3,650 \div 3,752 = \$.97$  per year or  $1/3\phi$  per day. This increment in administrative staff would result in much greater supervision in the field.

2. In addition to increased administrative staff, the amount of food provided would be increased by 25% resulting in an annual cost per child per day of about  $3\phi$ . (Food cost/day =  $12\phi$ .)
3. As a result of increased supervision and more food, it is estimated that length of stay at the center might conform to the actual planned period of four months. On this basis, cost per child served would be:  
 $120 \text{ days} \times (37\phi + 3\phi \text{ additional food and } 1/3\phi \text{ increased administrative cost}) = \$48.40$   
 $\$48.40 + \$2/\text{capita for rent of facility} = \$50.40 \text{ per recipient}$   
as compared to previous cost of  $\$75.54$ .

### Source of Information

1. Beaudy-Darisme, and Latham, Michael, C.: "Nutrition Rehabilitation Centers - An Evaluation of Their Performance," Draft prepared for 19th PAG Meeting, Geneva, Nov. 23, 1971.
2. King, K. W., Beghin, I. D. Fougere, W., Dominique, G., Grinker, R., and Foucauld, J.: "Two-year Evaluation of a Nutritional Rehabilitation (Mothercraft Center), Archivos Venezolanos de Nutricion 19: 245-261, 1968.
3. Beghin, I. D.: "Nutrition Rehabilitation Centers: An Evaluation of Their Performance," Document 1. 23/2, 19th PAG Meeting, Geneva, Nov. 23, 1971
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7. Bengoa, J. M. "Nutritional Rehabilitation Programmes" Presented at Symposium on Young Child Nutrition Programs: Evaluation and Guidelines, Zagreb, Yugoslavia, 23-27 August, 1971. In press.

8. Beaudry-Darisme, Interview, September, 1972.
9. Berggren, W.L. "Evaluation of the Effectiveness of Education and Rehabilitation Centers" in Proceedings Western Hemisphere Congress III; Miami Beach, Florida, August 30 - September 2, 1971; pp. 84-87, 1972.
10. Jelliffe, D. B. and Jelliffe, E. F. "The Nutritional Status of Haitian Children," Acta Tropica, 18: 1-45, 1961.

TYPE: Agriculture

EXAMPLE: High Lysine Corn - Colombia (CIAT)

Purpose:

To improve protein intake including that of vulnerable groups.

Delivery System:

Using Opaque-2 seed, farmer grows corn with roughly twice the amount of utilizable protein, and consumes part of produce.

Target Group Reached:

Age: Whole population including: pre-school children down to 1 to 1½ years and pregnant and lactating women.

Location: Rural areas (program may also be applicable to urban areas).

Impact:

Improve protein intake, not applicable to calorie or vitamin and mineral needs.

Reaches rural populations effectively, provided corn consumed in significant quantity - should also have impact in urban areas.

Contribution to Other Programs:

Improves the protein intake of the general population. Can improve level of farm income.

Annual Per Capita Cost:

Per individual reached: Additional cost of seed covered in high pro-

Per individual in need: ductivity of Opaque-2 relative to normal corn.

Who Pays: Absence of net cost predicated on favorable assumptions listed V. - Costs - Discussion.



## I. DESCRIPTION OF PROGRAM

### A. Purpose, Services Delivered, Method of Delivery

The following description is an attempt to project a fully operational program through extrapolation of some existing field trials.

The projection is based on a number of favorable assumptions which are listed under V. - Costs. - B. Discussion. The program is described for the maintenance phase following promotional work to get farmers to shift to use of Opaque-2 seed.

The program seeks to improve protein intake including that of vulnerable groups, through the growing of high lysine corn on small and subsistence farms. The shift to this corn is based on the assumption that this will also result in improvement of diet since part or all of the corn produced is also consumed.

Cost figures included are for a minimum program in which seeds are provided to the small farmer without attempting to introduce new agronomic practices. An example of this approach is found in an experimental effort undertaken by CIAT with 22 small farmers in five regions of Colombia. (1)

Described here is a fully operational or maintenance phase of the program when the farmer grows Opaque-2 exclusively. Nutritional impact is estimated by applying improved quality values of Opaque-2 to existing corn intakes of vulnerable groups on the assumption that a simple substitution will have taken place. Information on protein intake and corn intake of pre-school children was not readily available. Accordingly, as a substitute, data from a Guatemalan village were used. (3)



## B. Administrative Organization and Personnel

Distribution of seed would be handled through commercial channels or by the existing extension network. It is assumed that in the maintenance phase of the program described, which would follow initial promotion and acceptance, no significant education campaign personnel or expenditures would be needed. However, as projected here, the farmer would purchase Opaque-2 seeds each year, and to do this it might be necessary to institute some type of credit system for which administration and costs have not been projected. (It should further be noted, however, that this yearly purchase of seed may not really be necessary. The flinty Opaque-2 which would be used in this projection is not a hybrid. So that if all farmers in the area were using it exclusively and there was accordingly no danger of accidental cross, the seed would not have to be obtained annually.)

## II. WHO PROGRAM REACHES

### A. Numbers Served:

Program would reach all those in area where used.

### B. Qualifications for Participating in the Program

1. The program would be particularly applicable to the subsistence farmer in rural areas.
2. Age Range of Vulnerable Group Members Included in Program

The program would improve protein intake for all those consuming corn in significant quantities. However it is not clear whether the very young child, such as 12 months, would consume sufficient

corn for the program to have significant impact. Mata (3) reports a protein intake from corn consumption by this group of only 4.6 g.

Pregnant and lactating women would benefit from this program.

### 3. Socio-economic Status

Program would have particular relevance for the small and subsistence farmer.

### 4. Institutional Participation

The program would be available throughout the countryside

### 5. Other Factors Affecting Participation

It is assumed here that the problems of infestation would be overcome by the new flintier variety of Opaque-2. Under this assumption, there would not be a need for improved storage which might otherwise be a significant bar to program participation.

## C. Estimate of Coverage Program Potentially Capable of Providing

The approach appears capable of covering all groups in rural areas. A factor limiting coverage would be quantity of corn consumed. To have significant impact corn would have to be consumed as a large portion of the diet. This would apply both to the child under 18-12 months and other vulnerable groups.

## III. EFFECTIVENESS OF PROGRAM

### A. Extent Program Meets Deficiencies

The approach would appear to meet the protein deficiencies of children at least down to 18-12 months of age. This judgement is based on intake data from a Guatemalan village. (3)

The approach does not meet vitamin and mineral deficiencies.

The approach does not seek to add to the amount of food consumed. It is possible, however, that it may have an indirect effect on calorie consumption. It has been suggested (5) that increased protein intake may, by stimulating appetite, result in the child asking for more food, and that this in turn would result in more food being provided by the mother. (This hypothesis will be tested in a corn fortification trial being conducted in Guatemala).

#### Intake and Other information

For 24 month old child					
Nutrient	: Dietary : allowance : used <u>1/</u> :	: Normal : intake :	: Deficiency :	: Addition : to diet : (supplement, : etc.) :	: Percent : of : deficiency : met :
Protein: Note - all values converted to utilizable protein (100% bioavailability):	: <u>1/</u> : 14.8 g. :	: <u>2/</u> : 5.5 g. :	: 9.3 g. :	: <u>3/</u> : 7.9 g. :	: Almost completely met :
Calories	: <u>4/</u> : 1300 :	: <u>5/</u> : 614 :	: 686 :	: None :	: None :
Vitamins and minerals	:--Significant vitamin A deficiency is not met. : Information on extent of other deficiencies not : obtained.				

1/ Bressani (2) - based on weight of 12.3 kg.

2/ Mata (3) - intake of 17.2 g. reported in Guatemalan village for 24 mo. old children who have been weaned. 32% bioavailability of protein in normal corn is reported by Bressani (2). This is applied to 17.2 g. to yield 5.5 g. utilizeable protein. (17.2 g. is actually reported to represent about 80% of total protein intake. In these calculations however, it is treated as representing 100%).

3/ Bressani (1) reports a bioavailability for Opaque-2 of 69% as compared to normal corn (32%). This percentage plus a 1% increase in the protein content of Opaque-2 is applied to the 17.2 g. to yield 13.4 g. utilizeable protein. (13.4 - 5.5 = 7.9)

4/ FAO Standard (1957).

5/ Mata (3) reported for Guatemalan village.

B. Percentage of those Reached Estimated to Actually Have Significant Deficiency

Significant Deficiency

Weight for age data in Cali, Colombia indicates about 25 per-cent suffering from malnutrition. The area studied is near an urban center and may not be typical.

C. Clinical or Other Evaluations

Nutritional Quality of Opaque-2

12 severely malnourished children age 3 to 12 years were successfully rehabilitated on a diet in which all of the protein furnished came from Opaque-2 corn. Duration of the intensive feeding was about three months. (4)

Consumption

Interviews of farmers growing corn on Colombian farms where Opaque-2 was introduced yielded the following information on consumption:

1. Maize was mentioned as the food consumed most frequently. Maize was most frequently mentioned (69%) followed by meat (65%), rice (63%), plantain (60%) and cassava (58%).
2. One third of the families consumed all the maize produced on the farm. In addition the majority also bought maize due to insufficiency of their own production.
3. One third said they sold all or part of maize produced and bought maize used in the household. (reason given: 30% couldn't store, 20% no milling facilities).
4. Two-thirds of women reported Opaque-2 maize easier to prepare than ordinary maize.

5. Neither farmers nor wives reported any differences in taste between Opaque-2 and normal corn.

#### IV. CONTRIBUTION TO OTHER PROGRAMS

The approach improves the protein intake of the general population as well as the vulnerable groups.

The approach should also contribute to some extent to the general economic level of the small farmer. Yields per hectare would be slightly increased. Animals fed Opaque-2 should be substantially more valuable.

## V. PROGRAM COSTS

A. Annual Operating Cost Per Hectare of Corn Grown - Maintenance Phase of Program

(for computation and assumptions used, see B. - Discussion below)

	Central government	Local community or individual	External donor	Total
<u>Food</u>				Not applicable
(Raw materials)	( )	( )	( )	( )
(Processing)	( )	( )	( )	( )
<u>Transportation to Site</u> (includes handling and storage)				Not applicable
(Within country)	( )	( )	( )	( )
(External)	( )	( )	( )	( )
<u>Provision of Services at site</u>				Not applicable
(Operating personnel)	( )	( )	( )	( )
(Recurring Material costs)	( )	( )	( )	( )
<u>Motivation</u>				Not applicable
Costs - if applicable, to get consumers to accept food or otherwise participate in program				
<u>Administration</u>				
(Program direction)				
(Training)				
Other: Additional cost of seed		\$6.25/hectare		
Additional return from higher yield		\$15.10/hectare	equal	-\$8.85 or +\$8.85 gain to farmer
Difference		-8.85		
Total				Negative cost

Number of individuals served which should be used to convert above figures to a per capita basis. Not applicable

Total per capita operating cost - no cost to the beneficiary.

## B. Discussion

The figures contained in the preceding table apply to a program that has already gained acceptance, or in other words the maintenance phase of a program. Start-up costs of introduction are not included. (A rate of 20 pesos to the U.S. dollar is used).

### Assumptions:

The calculations are based on the following assumptions:

1. The program would be directed to the small farmer with the objective of getting him to substitute Opaque-2 for normal corn.
2. The program would be a minimum one which provided the new seed but did not include introduction of other inputs to improve production.
3. The cost of distribution of the seed would be included in the cost he would pay for purchase of the seed. (Annual purchase of seed is assumed required, although this may not actually be the case, see discussion under I. - A. - Administrative Organization and Personnel).
4. A system to assist the farmer to purchase seed (such as rural credit or easy terms provided by commercial seed retailers) would be in existence and would not require additional costs for administration.
5. The problem of storage would be met via the use of the harder flintier varieties of Opaque-2. Accordingly no additional costs are included for extra storage.
6. The harder flintier variety would be about equal in yield to white Opaque-2.



7. The additional 12% per hectare in yield of Opaque-2 can be converted by the farmer into added income or equivalent value. (This would obtain where the farmer could market at least a small amount of his produce when such produce rose above consumption needs. It would also obtain, if due to increased production, he could reduce other expenditures for food - many of the farmers in the test do make such purchases. A third alternative might be some type of barter of produce for seed which is to be tried out in a pilot test in Brazil).
8. Increased production per hectare by the small farmer would not result in a lowering of the market price per kilo.
9. The farmer would not use other hybrids with a slightly higher yield than some Opaque-2.

#### Cost Calculations

The additional cost for a farmer, who would otherwise use home processed seed, to produce Opaque-2 would be \$5.30 to \$7.15 per hectare. (1) The mid-point of these two figures or \$6.25 is taken.

In a field experiment conducted in Colombia, 22 small farmers located in five different regions grew Opaque-2 using their existing technologies rather than any improved practices. Yields were 12% higher than yields obtained with the seed these farmers normally used. The Opaque-2 and normal yields were respectively 2,198 kg./hectare and 1,962 kg./hectare. Using the average selling price of maize of \$.064/kg. the difference in value of production per hectare is \$15.10. The improvement in yield (\$15.10) thus covers cost of seed (\$6.25) with a surplus of (\$8.85).



## APPENDIX

COMPILER'S COMMENTSPotential Strengthes and Special Characteristics

Given the assumptions listed in costs above, the approach would appear to be the only type of intervention known which does not have continuing costs.

The approach reaches pregnant and lactating women. Protein intake of the general populaion is also improved.

Question Areas

The program is not directly applicable to calorie needs. (It may have, however, an effect on calorie consumption as discussed in Section II. - Effectiveness of Program above).

The approach does not meet vitamin and mineral deficiencies, which might become limiting. (Information was not obtained as to whether it would be possible to correct this problem over the long term through breeding.)

To make a significant contribution the approach requires that corn be consumed in fairly large quantity. Also see assumptions listed under V. - Costs - Discussion.

CAUSES OF MALNOURISHED STATE

Information not obtained.

PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSIONA. Present Coverage of Program Type (Worldwide)

Principal trials with the program are being undertaken in Colombia and Brazil. Other countries include Nigeria and Vietnam.

B. Mechanisms Presently Available for Implementing Program Type

1. Existing Institutions

It should be possible to implement the program without adding any particular institutional network. An initial campaign to interest farmers in using Opaque-2 seed would, however, be required. A system of credit might also be required.

2. Local Resources (Excluding Personnel)

The farm forms the setting for the intervention.

3. Local Manpower Source

The basic action is carried out by the farmer.

Source of Information

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3. Mata, L. "Fortification of Corn, Guatemala" in Food Fortification Workshop, Vail, Colorado, May 1-4, 1972; Agency for International Development, Washington, D.C. 1972.
4. Pradilla, A. - Interview, September 1972.
5. Mata, L. Bressani, R., LaChance, P., "Corn Fortification: A Field Demonstration Model", Mimeo, 1971.



TYPE: Fortification

EXAMPLE: High Protein Corn - Guatemala

Purpose:

To improve protein intake including that of vulnerable groups.

Delivery System:

A soy-lysine fortificant is added to corn at small village mills.

Target Group Reached:

Age: Whole population including: pre-school children down to 1 to 1½ years and pregnant and lactating women

Location: Rural village; also applicable to urban area.

Impact:

Improves protein and vitamin and mineral intake, not applicable to calorie needs.

Reaches rural (as well as urban) populations effectively, provided that: (1) corn consumed in sufficient quantity, (2) problems of monitoring do not constitute bar.

Contribution to Other Programs:

Improves protein intake of the general population.

Annual Per Capita Cost:

Per individual reached: \$2; \$6 (children 1-15, pregnant and lactating women); \$13 (children 1-5, pregnant and lactating women)

Per individual in need: Data not obtained, but more than above.

Who Pays: May be government, miller, consumer or a combination.

## I. DESCRIPTION OF PROGRAM

### A. Purpose, Services Delivered, Method of Delivery

This program seeks to improve protein intake including that of vulnerable groups.

Under a pilot project currently getting underway corn milled at the village level will be fortified with soy flour, **lysine** and vitamins and minerals.

Rural villages in Guatemala of 1,000 to 3,000 inhabitants usually have two to six small mills to which local families bring corn for milling. A price of 1¢ per pound is charged. In the pilot project the fortificant will be added at mills servicing a village of 1500. All corn milled will be fortified.

For purposes of estimating cost on expanded **operational** program is projected which would include in addition to milling, transportation of fortificant to the local mills, and monitoring of the fortification process by government inspectors.

### B. Administrative Organization and Personnel

Administration is limited primarily to monitoring of the fortification undertaken by the local millers.

For costing purposes the following system is projected:

#### Technical/Supervisor

One lower level inspector would visit the mills in each village about once every three months. Allowing time spent in transportation by jeep, and time at headquarters it is projected that he would be responsible for 70 villages.

### Higher Level Supervision

A supervisor, based at headquarters, would supervise a group of fifteen inspectors.

## II. WHO PROGRAM REACHES

### A. Numbers Served:

Program would reach all those in area where used.

### B. Qualifications for Participating in the Program

#### 1. Location

Fortification is in a rural village; equally applicable to urban areas.

#### 2. Age Range of Vulnerable Group Members Included In Program

The program would improve protein intake for all those consuming corn in significant quantities. However, it is not clear whether the very young child, such as 12-18 months, would consume sufficient corn for the program to have significant impact.

Mata (2) reports a protein intake from corn consumption by the 12 mo. group of only 4.6 g.

Pregnant and lactating women would benefit from the program.

#### 3. Socio-economic Status

Program would reach all income groups assuming either government or miller paid additional costs, or costs were passed on to all consumers under mandatory program.

#### 4. Institutional Participation

No special institutional participation would be required.

### 5. Other Factors Affecting Participation

Assuming a mandatory program, participation would be general. However if costs were absorbed by consumer, it is conceivable that increase might cause a shift in consumption away from corn.

### C. Estimate of Coverage Program Potentially Capable of Providing

The program appears capable of reaching all vulnerable groups in all areas where corn is consumed in significant quantity. Very young children, such as around one year might not benefit.

## III. EFFECTIVENESS OF PROGRAM

### A. Supplement

A supplement equivalent in weight to 8% of dry corn is added. Composition is 97.5% soy flour, 1.5% lysine, and vitamins and minerals, and 13% corn starch.

#### Source or Sources of Food Used

The mixture is currently imported, but in a large scale operation the soy at least could be produced locally.

### B. Extent Supplement Meets Deficiencies

The approach would appear to meet the protein deficiencies of children at least down to something under 12-18 months of age. The approach also meets vitamin and mineral deficiencies.

The approach does not seek to add to the amount of food consumed. It is possible, however, that it may have an indirect effect on calorie consumption. It has been suggested (3) that increased protein intake may, by stimulating appetite, result in



the child asking for more food, and that this in turn could result in more food being provided by the mother. (This hypothesis will be tested in the pilot project).

#### Intake and Other Information

Nutrient	Dietary allowance used <u>1/</u>	Normal intake	Deficiency	Addition to diet (supplement, etc.)	Percent of deficiency met
<u>Protein</u>	<u>1/</u>	<u>3/</u>		<u>3/</u>	Almost completely meets requirement
Note - all values converted to utilizable protein (100% bioavailability)	14.8 g.	5.8 g.	9.0 g.	11.0 g.	
	<u>4/</u>	<u>5/</u>		Not significant	None
Calories	1300	614	686		
Vitamins and minerals	Basic vitamin and mineral deficiencies (including vitamin A) are met by the supplement				

1/ Bressani (1) - based on weight of 12.3 kg.

2/ Mata (2) - intake of 17.2 g. reported in Guatemalan village for 24 month old children who have been weaned. 34% bioavailability of protein in normal corn, after undergoing traditional lime cooking, is reported by Bressani: (1) This is applied to 17.2 g. to yield 5.8 utilizable protein. (17.2 g. actually is reported to represent about 80% of total protein intake. In these calculations, however, it is treated as representing 100%).

3/ Bressani (1) - reports an increase in bioavailability of protein from adding mixtures of soy flour and lysine to 65%. Mata (2) reports an increase in total protein content by addition of the soy-lysine fortificant to a level of 12%. Applying these two figures to the original 17.2 g. (which is assumed delivered from corn with an 8% protein content) yields a total of 25.8 g. protein and 16.8 g. utilizable protein. The addition to the original amount of utilizable protein is 16.8 - 5.8 or 11.0 g.

4/ FAO Standard (1957).

5/ Mata (2) - reported for Guatemalan village.

#### C. Percentage of Those Reached Estimated to Actually Have Significant Deficiency

Information as to percent of vulnerable group population with protein deficiency not obtained.

D. Clinical or Other Evaluation

The study has not progressed sufficiently to permit evaluation of nutritional impact.

An acceptability test indicated that adults given corn tortillas made with and without fortificant could not detect difference. (3)

IV. CONTRIBUTION TO OTHER PROGRAMS

The approach improves the protein intake of the general population as well as the vulnerable groups.

V. PROGRAM COSTSA. Annual Operating Cost Per Village (1500 population)  
(see D-Discussion for computation)

	:	Central	:	Local	:	External	:	Total
	:	government	:	community	:	donor	:	
	:		:	or	:		:	
	:		:	individual	:		:	
<u>Food</u>	:		:		:		:	\$2,365
(Raw materials)	:	( )	:	( )	:	( )	:	( )
(Processing)	:	( )	:	( )	:	( )	:	( )
<u>Transportation to Site</u>	:		:		:		:	
(includes handling and storage)	:		:		:		:	\$912
(Within country)	:	( )	:	( )	:	( )	:	( \$871 )
(External)	:	( )	:	( )	:	( )	:	( 41 )
<u>Provision of Services at site</u>	:		:		:		:	\$ 32
(Operating personnel)	:	( )	:	( )	:	( )	:	( 21 )
(Recurring Material costs)	:	( )	:	( )	:	( )	:	( 11 )
<u>Motivation</u>	:		:		:		:	
Costs - if applicable,	:		:		:		:	
to get consumers to	:		:		:		:	Not
accept food or other-	:		:		:		:	applicable
wise participate in	:		:		:		:	
program	:		:		:		:	
<u>Administration</u>	:		:		:		:	
	:		:		:		:	\$4
(Program direction)	:	( )	:	( )	:	( )	:	( \$4 )
(Training)	:	( )	:	( )	:	( )	:	( )
<u>Other</u>	:		:		:		:	
	:		:		:		:	
<u>Total</u>	:		:		:		:	\$3,313

Number of individuals served which should be used to convert above figures to a per capita basis. 1500

Total per capita operating cost \$6.41

B. Cost of Physical Structure and Equipment Per Village

	: Government	: Local community	: External donor	: Total
Unit	:	:	:	:
4 feeders at \$50 each	: \$200	:	:	: \$200
Jeep for inspector (prorated)	: \$ 71	:	:	: \$ 71
	:	:	:	:
	:	:	:	:
	:	:	:	:
	:	:	:	:

C. Annual Costs Including Capital Depreciation, Interest on Investment, and Maintenance

	: Total	: Government	: Local community or individual	: External donor
Total operating cost (from V "A" above)	: \$3,313	:	:	:
Total of : *	: 81	:	:	:
(Depreciation)	: ( 27 )	: ( )	: ( )	: ( )
(Interest)	: ( 27 )	: ( )	: ( )	: ( )
(Maintenance)	: ( 27 )	: ( )	: ( )	: ( )
Total Annual Costs	: \$3,394	:	:	:
Total per-capita Annual Costs	: \$2.26	:	:	:

\*10% of capital investment is used for each main item or a total of 30% of capital investment.

## D. Discussion

The basis for cost estimates are described below. Information readily available as to the pricing of the different inputs was limited, so that, as in other descriptions, final costs provided should be considered illustrative.

### 1. Operating Costs Less Equipment (table A above)

#### Food

This would be the cost of the 8% fortificant minus the cost of the corn which it would replace. The total cost is \$2,365 which is computed as follows:

Price per pound of fortificant 11.4¢

Consists of 2.367% lysine, vitamin and minerals

---U.S. market price = \$1.59/lb.

mixing in U.S.	$\frac{.32/\text{lb.}}{\$1.91/\text{lb.}}$
----------------	--

cost of soy flour - U.S. market price is taken: \$.071/lb.

soy-flour at 97.6% x  $7.1\frac{1}{\text{¢}}/\text{lb.}$  + lysine, etc. at

2.4% x \$1.91/lb. = 11.4¢/lb. mix

At 8% fortification level, village needs 120 lbs/day or 43,800 lbs./year. Price of ground corn displaced by fortificant is estimated at 6¢/lb. (4)

#### Transport

Overseas (external) transport for lysine and vitamins and minerals is \$41 for 1 village for year.

---

1/ As information on Guatemalan produced soy flour was not readily available, a U.S. price was used as equivalent. The assumption is made that any efficiencies in local production and processing of soy flour will likely be offset by inefficiencies in soybean production and marketing, thus resulting in a price for flour equal to the U.S. price.

Internal transport of the soy-lysine fortificant, including storage mixing and handling is estimated at 2¢/lb. or \$871 for 1 village for year.

#### Provision of Services

The additional labor required by the miller to add fortificant is considered extremely small and value of time (to be provided by miller) has not been calculated.

Costs for monitoring the milling operation of \$32/village/year are calculated as follows:

An inspection visit would be made to each village every three months by an inspector. Allowing for transportation and time at the headquarters office, it is estimated that one inspector would be given responsibility for 70 villages.

Salary of inspector	= \$1500
(equivalent to mill supervisor (3))	

Recurring Material Costs - Gas	750
	<u>\$2250</u>

2250 ÷ 70 villages = \$32

#### Administration

One supervisor for every 15 mill inspectors is projected.

Salary of supervisor = \$4,500

\$4,500 ÷ 1,055 villages (15 x 70) = \$4/village

#### 2. Equipment (table B above)

Feeders are projected for an average of four mills per village. The cost for a feeder developed by Brooke of approximately \$50 is taken on the assumption that such a feeder could be perfected and adapted to a mass program. Cost of feeders per village is \$200.

A cost of \$5,000 is used for a jeep to provide transport for the inspector in rough areas. This figure is divided by 70 for a cost of \$71/village.

3. Annual Operating Costs Including Capital Depreciation, Interest On Investment, and Maintenance (Table C above)

The total figure is \$3,394. Costs per person are computed in three breakdowns listed below:

- a. Cost per capita = \$2.26  
(base 1500 village population)
- b. Cost - children = \$6.46  
(base 525 = children 450 projected from  
rural village in India  
plus 75 women 5% of 1500 base (worldwide  
estimate (5))
- c. Cost per vulnerable group member reached - children = \$13.30  
age 1 - 5 and pregnant and lactating women  
(base 255 = children 180 and women 75 (5))

The increase in price per pound of corn would be about 4/10¢ or about 40% of the 1¢/lb. which millers currently charge the consumer for grinding.

E. If applicable, Annual Per Capita Operating Costs Per Individual  
Actually in Need in Target Group Reached

Information on percentage in need not obtained.

F. If applicable, Estimated Share of Costs of Program Which Can Be  
Charged Off to Other Program Purposes

Some of the costs can be charged to the improvement of the protein intake of the members of the population other than the vulnerable groups, where such groups suffer from a protein deficiency.



APPENDIXCOMPILER'S COMMENTSPotential Strengths and Special Characteristics

The approach reaches pregnant and lactating women as well as pre-school children.

Protein intake of the general population is also improved.

The approach can be implemented fairly rapidly and simply. It would not normally require education of the populace with respect to choosing or consuming food.

Question Areas

The program is not directly applicable to calorie needs. (It may have, however, an effect on calorie consumption as discussed in Section II. - Effectiveness of Program, above).

CAUSES OF MALNOURISHED STATE

Information as to relative importance of lack of knowledge vs. food non-availability not obtained.

Other Contributing Causes1. Prevalence of Disorders

Children suffer from a high prevalence of diarrhea and infectious disease. (3)

2. Relative Importance of Disorders

These diseases are believed to play a significant role in determining nutritional status. (3)

### 3. If applicable - Success in Alleviating Disorders

(The fortification program is juxtaposed upon a health program which has been operated in the test village for a number of years. Information on extent of effectiveness was not obtained, but it is believed substantial).

## PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSION

### A. Present Coverage of Program Type (Worldwide)

Fortification of staples is currently limited to pilot projects (ongoing and planned) in Guatemala, Tunisia, Brazil, and Thailand and India.

### B. Mechanisms Presently Available for Implementing Program Type

The approach being tested in Guatemala should be applicable in rural areas (as well as urban) wherever staples are milled. This assumes, however, that the administrative task of monitoring large numbers of small mills proved feasible.

#### 1. Existing Institutions

The only institution required is some type of commercial milling process.

#### 2. Local Resources (Excluding Personnel)

Contribution to the cost of fortification may be either the government, the local miller, the consumer or some combination.

#### 3. Local Manpower Source

The basic operation of adding fortificant to the corn is performed by the local miller.

Source of Information

1. Bressani, R., "Improvement of Corn Quality" in Improving the Nutrient Quality of Cereals, Report of Workshop, Annapolis, Md., December 7-9, 1970; Agency for International Development, Washington, D.C. pp A-69-74.
2. Mata, L. "Fortification of Corn, Guatemala" in Food Fortification Workshop, Vail, Colorado, May 1-4, 1972; Agency for International Development, Washington, D.C., 1972
3. Mata, L., Bressani, R., LaChance, P., Corn Fortification: A Field Demonstration Model, Mimeo, 1971
4. Berntson, B., Rosenfield, D., "Economics and Nutrition Improvement", Paper presented at Conference, "Highlights in Food Science", Michigan State University, April 5, 1971, mimeo
5. World Food Programme and Nutrition Division, FAO, "Strategies for Establishing National Supplementary Feeding Programme", Document 1, 17/6, 19th PAC Meeting, Geneva, November 23, 1971.



TYPE: Commercial Foods

EXAMPLE: Incaparina - Guatemala and Colombia

Purpose:

To provide a low-cost nutritious food to vulnerable groups via commercial channels.

Delivery System:

Product is sold commercially as an item for use by whole family family.

Target Group Reached:

Age: Whole family including: pre-school down to age of 12 months.

Location: Mainly urban, some rural.

Impact:

Only small contribution to meeting deficiency is made.

Product appears capable, at least where marketed, of reaching rural populations via small stalls, as well as urban groups.

Contribution to Other Programs:

Provides marginal improvement in protein intake of adults which consume.

Annual Per Capita Cost:

Per individual reached: \$1.21 Colombia; \$2.42 Guatemala

Per individual in need: \$1.21 Colombia; \$2.42 Guatemala

Who Pays: Consumer

## I. DESCRIPTION OF PROGRAM

### A. Purpose, Services Delivered, Method of Delivery

Incaparina is a high protein food mixture which is marketed in Guatemala and Colombia as a nutritious food of use to the whole family.

It is sold in one pound or smaller polyethylene bags. A Guatemalan company, **Cervercia Centro-Americana**, manufactures and distributes the product in Guatemala and in Colombia it is produced by Quaker Oats

### B. Administrative Organization and Personnel

As the product is sold commercially, no government distribution organization is required. However, INCAP, which provides the license, does provide quality control.

In addition, in Guatemala, a small experiment is being conducted in which Ministry of Health field workers are being paid by the manufacturer to visit homes and combine the provision of nutrition education and related services with promotion of use of Incaparina as a protein food.

## II. WHO PROGRAM REACHES

### A. Numbers Served:

The following figures are based on experience in undertaking a 2,000 household survey of Guatemala and Cali province in Colombia. They were developed, however, in conversation, and may not correspond exactly to the survey data. (2,3)

#### 1. General Awareness and Consumption

- a. 75% of the population in Guatemala and 90% in Cali Province in Colombia are aware of the product.

- b. Two thirds of the population claimed to have tried the product.
- c. In Guatemala about 75% to 80% of the population in urban areas claim that they use the product on either a regular or irregular basis, with 30% being the corresponding figure for rural areas. In Colombia, the approximate percentages are estimated at 30% urban and 25% rural. (It should be noted that the rural area sampled in Colombia is near a large urban area and has an unusually good marketing infrastructure.)

## 2. Consumption Affecting Target Groups

About 5% of households in Guatemala and Cali Province, Colombia consume Incaparina on a sufficiently intensive basis to have relevance to nutritional status. Consumption is about 15 grams per day per consuming person, or four grams of protein per day.

## B. Qualifications for Participating in the Program

### 1. Location

The 5% that consume regularly is estimated to consist of roughly 8% of the urban population and 1% to 2% of the rural population.

(Small stands and stalls selling sugar, cinnamon, etc. reach 90% of the rural population. These stalls also market Incaparina)

### 2. Age Range of Vulnerable Group Members Included in Program

Consumption is distributed fairly evenly throughout the family and includes children in the one to five age group in about 80-90% of the households.



### 3. Socio-economic Status

Applying rough income estimates to the consumption figures provided above yields the following table.

	<u>Guatemala</u>		<u>Colombia</u> <u>Cali Province</u>	
	<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
% of population consuming about 15 g/day	8%	1-2%	8%	1-2%
% of consuming population classified as low income	50%	80%	60%	80%

Approximately 80-90% of pre-school children in the consuming households consume at the rate of approximately 15 g/day.

### 4. Institutional Participation

Not applicable to commercial use of the food.

### 5. Other Factors Affecting Participation

In Guatemala Incaparina appears to have reached a plateau and in Colombia is decreasing in popularity.

Some reasons suggested for the lack of dramatic success are (2,3):

- a. Because Incaparina is presented for use as a conventional food, a soup gruel known as a "collada," it is believed that it is compared by the housewife with such food. In Guatemala the housewife would otherwise prepare a collada from corn which she could purchase at one quarter the price.
- b. In Colombia, the price of traditional sources of collada are roughly equivalent to Incaparina. Here, however, Incaparina does not compete favorably with respect to



organoleptic qualities. (A new rice-based product is now being introduced.)

- c. In Colombia, new products similar to Incaparina have been introduced. Taking Incaparina and these other products as a group, volume of sales has remained approximately constant.

C. Estimate of Coverage Program Potentially Capable of Providing

The program can serve all vulnerable groups less children below the age of 1. It would not appear to be significantly limited by distribution outlets, which are estimated to include 90% of the rural population. Limitation due to ability to pay is not determined.

III. EFFECTIVENESS OF PROGRAM

A. Supplement - If Applicable

Composition -

Provided in 1 lb. or smaller polyethylene bags. Introduced in two different formulas - Principle components: Guatemala - 58% corn and 38% cottonseed flour; Colombia 58% corn, 19% cottonseed flour, 19% defatted soy flour. (In Colombia a new rice-based formula has recently been introduced).

In both countries Incaparina is consumed as a "collada" or liquid with consistency of heavy soup. This is done by mixing the Incaparina flour with water. It is used in place of other "colladas" which would otherwise be consumed.

Source

Commercially produced.

B. Extent Supplement Meets DeficienciesJudgement and Narrative Comment

Based on dietary intake information for a Guatemalan village (1), 15g would make only a marginal contribution to protein and calorie deficiencies as indicated by the table below. Vitamin A deficiencies are, however, almost completely met.

It should be noted that Incaparina was designed for a daily intake of 75g rather than 15g and in these quantities it would meet deficiencies.

Intake and Other Information (if available)

Nutriment	: Dietary Normal :		: Addition to : Percent of	
	: allowance: Intake. Deficiency :		diet (sup- : allowance met	
	: used : 1/ :	2/ :	plement, etc); by supplement	
Protein	: 57% :	43% :	4g :	10%
Calories	: 77% :	23% :	55 cal. :	3%
Vitamin A	: 44% :	56% :	750 i.u. :	34%
Iron	: : :	0% :	1.4 mg. :	18%

C. Percentage of Those Reached Estimated to Actually Have Significant Deficiency (if applicable)

A very estimate indicates that one-half the households in Cali, Colombia and Guatemala have deficiencies.

1/ Intake for Santa Maria Cauque, Guatemala expressed as a percentage of recommended dietary allowance. (1)

2/ Percent of requirements met by normal intake of children two to three years in Santa Maria Cauque, Guatemala. Nutrient values based on original formula which has since been modified.

D. Clinical or Other Evaluations

Not obtained.

14. CONTRIBUTION TO OTHER PROGRAMS

Improves protein intake of adult members of the population to a rather limited extent.

V. PROGRAM COSTSA. Annual Operating Cost Per Capita

(For basis of computation see below (\*).

	Central Government	Local Community or Individual	External Donor	Total
<u>Food</u>				
(Raw Materials)	( )	( )	( )	( )
(Processing)	( )	( )	( )	( )
<u>Transportation to Site</u>				
(includes handling & storage)				
(Within Country)	( )	( )	( )	( )
(External)	( )	( )	( )	( )
<u>Provision of Services at Site</u>				
(Operating Personnel)	( )	( )	( )	( )
(Recurring Material Costs)	( )	( )	( )	( )
<u>Motivation</u>				
Costs - if applicable, to get consumers to accept food or other- wise participate in program				
<u>Administration</u>				
(Program Direction)	( )	( )	( )	( )
(Training)	( )	( )	( )	( )
<u>Other</u>				
<b>TOTAL</b>		Colombia \$1.21 Guatemala \$2.42		Colombia \$1.21 Guatemala \$2.42

\*Computation: 15 g/day/per individual consumption is assumed.

15g x 365 days = 5,475g or 5.5 kg.

5.5 kg. x \$.22/kg. (Colombia) = \$1.21

x .44/kg. (Guatemala) = \$2.42

B. Cost of Physical Structure and Equipment

	Gov't	Local community	External Donor	Total
Per unit				
Not Applicable				

C. Annual Costs Including Capital Depreciation, Interest on Investment, and Maintenance

	Total	Central Government	Local Community or Individual	External Donor
<u>Total Operating Cost</u> (from IV "A" above)				
<u>Total of: *</u>				
(Depreciation)	( )	( )	( )	( )
(Interest)	( )	( )	( )	( )
(Maintenance)	( )	( )	( )	( )
<b>TOTAL ANNUAL COSTS</b>				
<b>Total Per-Capita Annual Costs</b> (can be filled in by USDA)	1.21 Colombia 2.42 Guatemala		\$1.21 Colombia \$2.42 Guatemala	

D. Annual Per Capita Operating Costs Per Individual Actually  
in Need in Target Group Reached

Although all those consuming product would not be in need, costs for a completely commercial product would be figured on the basis of retail price to each consumer which remains constant.

E. Estimated Share of Costs of Program Which Can Be Charged Off  
to Other Program Purposes

Not applicable



AppendixCOMPLIER'S COMMENTS ON PROGRAMA. Potential Strengthes and Special Characteristics

The fact that the product was marketed through small stalls covering 90% of the rural population suggests that this approach has potential as an intervention in rural areas.

The experiment in Guatemala using health workers suggests a type of government-private cooperation, which deserves very careful attention.

B. Question Areas

Reasons for lack of greater market penetration have been discussed p.3. II. B. 5 (text). An additional question to be considered is whether a commercial food supplied as a supplement adds to the diet or merely substitutes.

PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSIONA. Present Coverage of Program Type (Worldwide)

Incaparina is currently being marketed in Colombia and Guatemala. Other commercial products, ranging in cost to the consumer, are being marketed in a significant number of countries.

B. Mechanisms Presently Available for Implementing Program Type

1. Existing Institutions - Stalls exist in many rural areas which could provide outlets for marketing.
2. Local Resources - Local or foreign food companies provide the supply resource. Whether, and under what circumstances, the local population might provide sufficient demand is not known.

Source of Information

- (1) Behar, M., Bressani, R. "Experience in Development of Incaparina for the Pre-School Child," Pre-School Child Malnutrition, Primary Deterrent to Human Progress, National Academy of Sciences, Washington, D.C.; pp. 213-219, 1966.
- (2) Kracht, U. "The Economics and Marketing of Protein-Rich Food Products Status Report," in Proceedings Western Hemisphere Congress III, Miami Beach, Florida, August 30-September 2, 1971; pp. 99-102, 1972.
- (3) Kracht, U. - Interview, September 1972.



TYPE: Media Education

EXAMPLE: Radio and TV - Cuba

Purpose:

To teach women improved practices in the selection and preparation of nutritious foods.

Delivery System:

Weekly broadcasts are made over radio and TV by a recipe "personality."

Target Group Reached:

Age: The entire population with some special messages for pre-school children feeding.

Location: Rural and urban areas

Impact:

Observation indicates the program makes some contribution to influencing action as well as creating awareness, but evaluation as to extent of impact has not been made.

Program covers entire population.

Contribution to Other Programs:

Not applicable.

Annual Per Capital Cost:

Per individual reached: Radio 7/10¢; Radio and TV 39¢  
(using children 0-5 and pregnant and lactating women as base)

Per individual in need: Information not obtained, would be more than above.

Who Pays: Government

## I. DESCRIPTION OF PROGRAM

### A. Purpose, Services Delivered, Method of Delivery

The purpose of this program is to teach women improved practices in the selection and preparation of nutritious foods. An effort is made to influence the general diet with special messages included on diet of pre-school children.

The program consists of 6 five-minute radio presentations each week and 3 twenty-seven minute TV presentations.

The program does not bill itself as a nutrition education program or use a direct nutrition education technique. Instead a figure who is well known as cook, the Julia Childs of Cuba, as it were, provides recipes and gives cooking demonstrations. Discussion of nutritional impact of foods is included, where appropriate, but this is done in the context of a more general discussion of recipes.

The strategy behind the program would appear to be first, that women have a continuing interest in new recipes, second that identification with a popular purveyor of such messages will facilitate acceptance of the nutrition education aspects.

### B. Administrative Organization and Personnel

The staff of the program consists of the individual described above, who appears on the program, and one assistant.

Preparation of the program material is done by this staff as well as presentation.

## II. WHO PROGRAM REACHES

### A. Numbers Served:

The program reaches the majority of the population in Cuba. Homes generally have radios. Most villages have TVs available at community centers.

### B. Qualifications for Participating in the Program

#### 1. Location

Country-wide.

#### 2. Age Range of Vulnerable Group Members Included in Program

Presentations are provided on general diet with special messages concerning pre-school children. Information was not obtained as to whether special messages are included for pregnant and lactating women.

#### 3. Socio-economic Status

Reaches all groups.

#### 4. Institutional Participation

The TV portion of the program will, for many, only be available at a community center.

#### 5. Other Factors Affecting Participation

As described in I. Description - above, a special effort is made to set up a rapport and identification for the listener with the purveyor of the nutrition education message.

### C. Estimate of Coverage Program Potentially Capable of Providing

The program appears to reach the majority of the Cuban population. In most developing countries TV is not available. However in many countries transistor radios are widely used even in relatively remote rural areas.

### III. EFFECTIVENESS OF PROGRAM

#### A. Percentage of Those Reached Estimated to Actually Have Significant Deficiency

Information was not obtained.

#### B. Clinical or Other Evaluations

No evaluation has as yet been made of the program. However "fan" mail received suggests that the program does have general appeal. Mail received also suggests that the message goes beyond creation of awareness to influence specific actions. As an example, Nitza Villapol, the program principal, believes that some success has been achieved in inducing a shift from consumption of starchy roots to rice and macaroni. She notes a greater response from young mothers. (2) To what extent the program has effect, (including how significant), is not known. (This information may become available with the institution of some planned opinion surveys.

### IV. CONTRIBUTION TO OTHER PROGRAMS

The program is applicable to the general population as well as vulnerable groups.

V. PROGRAM COSTSA. Annual National Operating Cost

(For basis of computation see discussion below)

	:	Radio	:	Radio and TV
	:		:	
1. Salaries of speaker and assistant	:	\$11,500	:	\$11,500
2. Radio time	:	\$ 156	:	\$ 156
3. TV time	:		:	\$21,060
4. Depreciation, Interest and Maintenance: on TV receiver ( = 30% value)	:		:	\$637,500
	:		:	
Total	:	\$11,656	:	\$670,216

Number of individuals served which should be used to convert  
above figures to a per capita basis. 1,710,600

Total per capita operating cost. Radio 7/10¢; Radio and TV 39¢.

B. Discussion

Costs were calculated as follows:

- Salary for the type of individual required is estimated at \$10,000 in a developing country. Salary of assistant \$1,500.
- Radio time - U.S. rate for a station of about the size equivalent for covering Cuba estimated at \$6 per hour.  
30 minutes/week at \$6/hr. = \$156/year.
- TV time - U.S. rate for a station of about the size equivalent for covering Cuba is estimated at \$300 per hour.  
81 min./week at \$300/hr. = \$21,060/year

4. Cost of TV receiver estimated at \$250. At rate of 1 receiver per village of 1,000 population (or per 167 families) cost would be  $\$250 \times 8,500 = \$2,125,000$ .

10% each for depreciation, maintenance, and interest on investment = 30% of \$2,125,000 = \$637,500.

Children age 0-5 and pregnant and lactating women are estimated at 20% (3) of the total population (8,553,000) or 1,710,600.

Annual per capita costs would therefore be:

Children 0-5 and pregnant and lactating women---

Radio = 7/10¢      Radio and TV = 39¢

If 20% of this group were in need in Cuba, cost per individual in need would be---

Radio 3½¢      Radio and TV = \$1.95

Per capita costs for the whole population are---

Radio 1/7¢      Radio and TV = 8¢

C. If applicable, Annual Per Capita Operating Costs Per Individual

Actually in Need in Target Group Reached

Information not obtained, if 20% in need costs would be: radio 3½¢, radio and TV \$1.95.

D. If applicable, Estimated Share of Costs of Program Which Can Be

Charged Off to Other Program Purposes

A portion of the costs can be attributed to improvement of the diet of the general population.



## APPENDIX

### COMPILER'S COMMENTS

#### Potential Strengthes and Special Characteristics

The program is extremely low cost. (Costs might be considerably higher if languages and food consumption patterns differed among relatively small population groupings).

The particular approach used here, while not scientifically evaluated, appears logically to have considerable potential. Experience in the developed countries indicates that "personalities" do create important followings in their specialty area. This technique transferred to cooking/nutrition education also has the virtue of simplicity.

#### Question Areas

The extent of impact and whether it is really significant remains to be determined. Whether the program would be effective without TV is also not known.

A program of this type is based on the premise that lack of knowledge rather than lack of access to nutritious food is the main cause of deficiency. Depending on the situation this may not be the case. (Even where it was necessary to increase access to nutritious food, however, this approach might constitute a useful adjunct).

### CAUSES OF MALNOURISHED STATE

#### Reasons for Food Deficiency

In Cuba, due to rationing system, malnutrition would be mainly caused by lack of knowledge rather than lack of access to nutritious food.

PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSIONA. Present Coverage of Program Type (Worldwide)

It is believed that a considerable number of countries use national radio to make some type of announcement concerning nutrition. Development, however, of a fairly imaginative campaign, as described here, is believed very limited. A multi media pilot project in India and a test planned for Ecuador will provide data on impact.

B. Mechanisms Presently Available for Implementing Program Type1. Existing Institutions

For radio no institutional network is required. In the case of TV some type of community meeting center is required.

2. Local Resources

In many developing countries transistor radios are widely used even in relatively remote rural areas.



Source of Information

1. Villapol, N. "Nutrition Education by Radio and TV"  
presented at IX International Nutrition Congress,  
Mexico September 1-8, 1972. Mimeo.
2. Villapol, N. Interview, September 1972.
3. World Food Programme and Nutrition Division, FAO  
Strategies for Establishing National Supplementary Feeding  
Programmes.  
Document 1.17/6, 19th PAG Meeting, November 1971.



TYPE: Combined Nutrition and Health  
(Data on single purpose supplement, and health care programs also included.)

EXAMPLE: Salaried Personnel, Daily Feeding - India (Naranwal)

Purpose: (Research project)

Combined services: to improve diet and general health

Nutrition supplement: to improve diet

Health care only: to improve general health

Delivery System:

Needy children are identified and monitored via home visits.

Feeding stations provide daily supplements. Health care is dispensed partly via home visits and partly via village clinic.

Target Group Reached:

Age: 0-36 months.

Location: Rural villages

Impact:

Significant improvement in the nutritional health achieved in combined program and supplement program. Mortality rate reduced by half.

Program appears capable of reaching majority of population in rural areas.

Contribution to Other Programs: .

Combined program is equally as much general health as nutrition.

Annual Per Capita Cost:

Per individual reached: \$17

Per individual in need: \$17

Who Pays: Research project - information on cost distribution for  
operational program not obtained.

I. DESCRIPTION OF PROGRAMA. Purpose, Services Delivered, Method of Delivery

This is a research pilot project which provides combined nutrition and health services to some villages and nutrition or health services by themselves to others. For ease of comparison, the three variations will be described consecutively under the headings: Nutritional Supplement (for nutritional supplement alone), Infection Control (for infection control alone), and Combined Services (for provision of both services).

A third heading Applicable to All Programs will be used where the data refers to all three programs. Research or information gathering aspects of the activity, as opposed to direct provision of services, will be excluded from the description.

---

Nutritional Supplement: The purpose is to improve the nutritional health of young children by provision of nutrition supplements.

Infection Control: The purpose is to improve the nutritional health of young children by provision of services to control infection and disease including diarrhea.

Combined Services: The purpose is to improve the nutritional health of young children by provision of a combination of nutritional supplements and measures to control infection and disease, including diarrhea.

B. Services Delivered, Method of Delivery

Nutritional Supplement: The surveillance approach is used in which children suffering from malnutrition are identified via home visits plus growth surveillance, and supplements are provided to those children only via daily distribution at feeding stations

Weights and heights are obtained at home every month for the first nine months and then at progressively longer intervals.

Locally available foods and methods of preparation are being used increasingly.

The feeding stations which have been established in the villages are manned by village attendants (village girls or women with sufficient education to maintain records). Usually a grandmother or sibling, brings the child to the feeding center twice daily to receive the supplement. The supplement is provided mid-morning and mid-afternoon as an addition to the normal meals consumed by the child at home. Children participate in the program until they reach 80% of standard weight for age. Usual length of participation is about a year.

In addition, during the harvest period, an attempt has been made by the lady health visitors to organize day care centers where the child can reside for the day. These centers also employ village attendants.

(A program of community participation is being tried out involving the local village governing council which: 1. appoints a representative to be responsible with the Lady Health Visitor for the functioning of each feeding center; 2. donates foods to help run the centers (such councils have agreed that at the end of harvest, the villages will provide 4.1 kilograms of wheat per landholding household to be used either for food or for sale and purchase of milk, sugar, and oil.) - In the most recent trial of this approach, a village provided some food and two feeding center

attendants, for 12 lower caste children who attended the center.)  
Infection Control - Immunization is provided concentrating on DPT, BCG and measles. This has been provided in some cases through periodic mass vaccination programs and in others via routine visits of village workers.

Diagnosis and treatment of other infectious diseases is provided by health auxiliaries living in each village who have been trained as auxiliary nurse practitioners.

Each child is visited at home by a lady health visitor at weekly intervals. Sick children are identified during visits and in most instances can be cured by simple therapy e.g., early gastrointestinal infections can be started on simple treatment. Sugar-salt-water and a balanced diet are provided as treatment. Sulforamides are used for diarrhea with fever.

Combined Programs - The two sets of services described above are combined.

## C. Administrative Organization and Personnel

### Applicable to All Programs

1. Auxiliary (The ratio of personnel to target group used below is for the current pilot project. Ratio of target group to personnel would be approximately double in projected operational program for which costs are provided.)

Village attendant - a village woman or girl with basic literacy  
 (a) prepares and distributes food to children and prenatal and lactating mothers and keeps records of feeding programs;



(b) takes part in formal health education sessions; (c) refers medical problems as observed; (d) helps in immunization drives.

There are usually about three village attendants at a feeding center, each one for 10 children. The attendants must have basic literacy. They are provided one half day of training each month by supervisory personnel.

## 2. Technician/Supervisor

Lady Health Visitor (LHV) - (a) provides simple child care via home visits (once/week) plus holding of clinics at subcenter; (b) refers more complicated cases to physicians; (c) organizes and plans various activities including teaching village attendants and public.

The ratio would be one LHV per 80 to 120 children. The LHV, must be a high school graduate. She receives  $2\frac{1}{2}$  years post-high school training, plus a 10 week special course and one half day on the job training each week.

## 3. Higher Level Supervision and Administration

Public-Health Nurse - makes weekly visits to: (a) spot-check treatment given; (b) check organization of clinics; (c) organize and supervise training programs and logistics, and record keeping.

The public health nurse (PHN supervises 10 LHVs (PHN ratio to children is 1/800-1,200). The PHN receives informal on the job training.

Physician - makes weekly visits to village to: (a) see all cases referred; (b) spot-check execution of service programs; (c) provide instructions about follow-up of hospitalized cases; (d) teach all members of the team.



The ratio of the physician to LHVs is also 1 to 10.

## II. WHO PROGRAM REACHES

### A. Numbers Served:

In a single village 30-60 children (0-3 years) receive food supplements, 80-200 receive infection control care; and 80-200 mothers are provided nutrition and health education.

### B. Qualifications for Participating in the Program

#### 1. Location

##### Applicable to All Programs

The program is located in villages in rural areas.

#### 2. Age Range of Vulnerable Group Members Included in Program

##### Applicable to All Programs:

The age of the children reached is 0 to 3 years.

#### 3. Socio-economic Status

##### Applicable to All Programs

All children, regardless of socio-economic class are included.

#### 4. Institutional Participation

##### Applicable to All Programs

The delivery of services is built upon a system of home visiting for identification of children needing care. To receive a food supplement or to get certain types of medical services attendance at a feeding center or the village clinic is necessary. In the Punjab, the total population in the rural area lives within the confines of compact villages. The feeding center, located, at the center of the village is no more than about 300 yards from any household. It was found that neither

this distance, nor the need to bring the child to the center. twice a day constituted a bar to full participation.

#### 5. Other Factors Affecting Participation

Participation in the programs was not found to be a problem. On the average only two or three families per village did not accept the program.

#### C. Estimate of Coverage Program Potentially Capable of Providing

The programs would appear capable of reaching all mal-nourished children age 0-3 in rural areas where the population live in compact villages.

### III. EFFECTIVENESS OF PROGRAM

#### A. Supplement

##### 1. Composition

Wheat oil, sugar and milk are used as ingredients for the preparation of a weaning food which is fed twice a day. The child is provided a 150 gram mixture. However, he is given as much as he wants and sometimes consumes several portions. The rough target of the feeding program was to provide one third of the protein allowance and two thirds of the calories.

##### 2. Source or Sources of Food Used

Initially provided by U.S. PI480, subsequently obtained in village.

#### B. Extent Supplement Meets Deficiencies

##### 1. Judgement and Narrative Comment

The supplement meets total deficiency.

2. Intake and Other Information

Nutrient	: allowance	: Normal intake	: Deficiency	: Addition to diet (supplement, etc)	: Percent of deficiency met
Protein	: ICMR 1/ allowance	: 90% 3/ of ICMR	: 10%	: 33% 2/	: Deficiency completely met with overage.
Calories	: ICMR 1/ allowance	: 60% of ICMR	: 40%	: 66%	:

- 1/ ICMR standards were at time of commencement of trial roughly equivalent to current FAO standards
- 2/ Feeding was provided a liberatum (see A above). Percentages given here were a rough target used.

C. Percentage of Those Reached Estimated to Actually Have Significant Deficiency

Only those with deficiencies are reached.

D. Clinical or Other Evaluations

A comparison of results between the three types of programs indicates that:

- Both the combined program and the nutrition supplement program effect about an equal improvement in weight gain, with the infection control program alone having little impact.
- Only the combined program appears to have significant impact on morbidity.
- All three programs have roughly equal impact on mortality (figures were averaged for all programs but observation indicated about equal impact of each program).

The results obtained for each of the programs is summarized in the table which follows:

162  
Summary of Evaluation

<u>Measure used</u>	<u>Combined Program</u>	<u>Nutrition Supplement</u>	<u>Infection Control</u>
Longitudinal <sup>1/</sup> survey of weight gain	Over 30 mo. test period average weight gain of male was 1 kg above control; female = $\frac{1}{2}$ kg.	Data not yet available	No significant difference from control
<sup>1/</sup> Cross sectional survey of weight at 3-33 mo. of age.	No significant difference at 3 mo. but by 33 mo. high caste children $\frac{2}{3}$ kg. higher than control; low caste 1 kg higher than control	Approximately same as for combined program.	No significant difference from control
Incremental weight gains	0-12 mo. period--60% of test & control group below British standard. 24-30 mo. period--60% of control group still below; while only 30% of test group remained below British standard.	Samples not large enough to obtain meaningful data	No significant change from control.
Average hemo- <sup>2/</sup> globin level	9.6 gm% level vs. 8.4 gm% control	9.6 gm% level vs. 8.4 gm% control	No significant difference from control
Mortality Age 0-4	Test group: 30.5/1,000 children (average for all villages participating in any of 3 programs. (Control: 62.5/1,000 children)	→	→
Mortality Age 0-1	Test group: 74.6/1,000 live births (average for all villages participating in program) Control 229/1,000 live births.	→	→
Morbidity	Over 18 mo. period Mansuran and Ratan villages declined from about 250 illness days per year to 185 illness days per year per child. Control chosen was later determined to be extremely healthy village in terms of illness days per year and, therefore does not provide meaningful comparison.	Saya village maintained high rate illness days per year while receiving infection control only, but declined to about 185 when nutrition supplement added  →	Saya village maintained high rate of illness days per year when provided infection control only  →

<sup>1/</sup> The weight gain data provided is the average for the entire pre-school child population of the villages receiving treatment. It represents in reality a much larger weight gain among the actual portion of the population that was below 70% weight for age and therefore received supplements.

<sup>2/</sup> Results attributed to iron and folic acid supplied to the children.



IV. CONTRIBUTION TO OTHER PROGRAMS

The program contributes to improving nutritional status and to improving general health of pre-school children in about equal proportions.

V. PROGRAM COSTS - For 450 householdsA. Annual Costs Including Capital Depreciation, Interest on Investment, and Maintenance

	Total	Central government	Local community or individual	External donor
<u>Total operating cost</u> (from V "A" above)	Included in total below.			
<u>Total of :</u>	Included in total below			
(Depreciation)	( )	( )	( )	( )
(Interest)	( )	( )	( )	( )
(Maintenance)	( )	( )	( )	( )
<u>Total Annual Costs :</u>				
Supplement	\$1,333 <sup>1/</sup>			
Infection Control	\$1,333 <sup>2/</sup>			
Combined Program	\$2,000 <sup>3/</sup>			
<u>Total Per-Capita Annual Costs</u>	1/			
Nutrition Supplement	\$16.70			
Infection Control	\$ 8.35 <sup>2/</sup>			
Combined Program	\$20.00 <sup>3/</sup>			

- 1/ \$1,333 is cost for feeding one half of pre-school population in 450 households or 80 children which is roughly number that are malnourished. \$16.70 is the cost per child fed.
- 2/ \$1,333 is cost for providing infection control services, less food supplementation, to pre-school children of 450 households or 160 children. \$8.35 is the cost per child.
- 3/ \$2,000 is cost for providing combined services. This would be infection control services for the total pre-school population (0-3 years) and feeding for one-half of that population. \$20 is per capita cost of combined program serving only the 80 malnourished children = \$1,600.

B. Discussion1. Derivation of figures (Rate of 7.5 rupees to U.S. dollar used.)

Cost estimate (1) is based on (a) elimination of research and demonstration costs; (b) reduction of salaries and other expenditures to government scales and volume purchases, and (c) doubling households to be served without increasing total volume of services.

Items included in total annual costs are:

Capital infrastructure (including land), and equipment (Does not include interest on investment. Capital depreciation and maintenance on physical structure is 1.5% for each item versus 10% used in write-ups of other programs. Equipment, including vehicles, is depreciated at 10%.

Salaries of operating personnel

Food

Supplies (including drugs)

Referrals - Estimated cost of services provided by higher level health center when patient referred.

Administration - higher level supervision - salaries, supplies, transportation, etc.

2. Note on alternative means of computation

The usual time required to rehabilitate the child is one year. Accordingly, the figure provided for supplementation could be considered a start-up cost or cost of alleviating malnutrition among the initial group of malnourished children, about 50% of the total or 80. After the first year a reduction in the 50% has been observed. The remaining children requiring treatment are new malnourished children age 0 to 1, and other children, particularly

from the healthy half of the pre-school population, who become malnourished. Observation suggests a reduction by the second year of those requiring treatment to about 40% of the total pre-school population, and to about 35% by the third year. It is believed, but not yet known, that this downward trend will continue in yearly increments of 5% until a plateau of perhaps 20% is reached.

Using the reduced percentages, costs could be computed as follows. The number of children serviced in the third year would be 35% of 160 or 56. Costs would be 56 times cost per child of \$16.70 equaling \$935. However, if this figure is used as the real maintenance cost of keeping 80 children, who would otherwise be malnourished, in moderately good condition, \$935 should be divided by 80 for a per-capita cost of \$11.69. Alternatively, if the sixth year 20% figure is used, per capita maintenance cost would be \$6.68.

### 3. Addition of family planning and women's services

The following table gives comparative costs where family planning and women's services are added. Costs are figured on the basis of 450 households which is the base from which the 160 children receiving combined infection control and nutrition supplements are drawn:

<u>Service</u>	<u>450 Households</u>	<u>Per Household</u>
Family planning and women's services	\$2,000	\$4.44
Combined Nutrition Supplement and In- fection Control 0-3 age children	\$2,000	\$4.44
Women and Child Pro- grams Together	\$3,332	\$7.41





AppendixCOMPILER'S COMMENTS ON PROGRAMA. Potential Strengthes and Special Characteristics

Program uses selective approach where effort is concentrated on identifying via surveillance those children suffering from mal-nutrition and then providing supplements to that group. This approach is based on the thesis that "It takes far less effort to conduct this surveillance and then try to get ~~maximum~~ cooperation in adequate supplementation for children with unsatisfactory increments, than it does to try to mount a mass nutritional supplement program." (2)

The program covers the most vulnerable period for pre-school children 0-3.

Daily feeding was not found to be a problem in the compact Punjab village.

The program is experimenting with an idea of contribution of food, not by the participating households alone, but by the whole village.

There is a marked difference between the nutritional status of male and female children which points to the need to get at the problem influencing the degree to which female children are wanted.

The data indicates that March to August represents the time of maximum nutritional deterioration. It is believed that this pattern is related to the fact that children receive less care during the harvesting period and to the frequent occurrence of diarrheas during the hot season.

A comparison of the impact of the three approaches used is contained in Section III.

## B. Question Areas

The feeding center approach used would seem dependant on the concentration of the rural population in compact villages.

The pregnant and lactating woman is not included in this description. (The research project does, however, include programs in which both nutrition for young children and general care for women is provided.)

## CAUSES OF MALNOURISHED STATE

### A. Reasons for Food Deficiency

Principle causes are judged to be:

#### For lower income groups

- a. During harvest, lack of availability of mother (considered most important factor during this period).
- b. Lack of availability of food

#### For higher income groups

ignorance of mothers about appropriate patterns of child care

#### For all groups

fact that girls are less wanted than boys

### B. Other Contributing Causes

#### 1. Prevalence of Disorders

##### a. Extent of diarrhea

Diarrhea occurs mainly over the summer or harvest months, May-July. During this period it is reported prevalent in about one third of the children at any one time.

##### b. Extent of Parasitic Infection

Few parasites were found. The highest prevalence was

giardia - 20%. Other parasites were relatively rare in this age group.

c. Extent of Disease Effecting Children

In three villages studied illness days per child per year prior to commencement of program were 250.

2. Relative Importance of Disorders

Diarrhea is believed to make a very large contribution to the death rate. Its contribution to morbidity is not so great. Diarrhea tends to be most prevalent in children with inadequate diet. (Due to the difficulty in identifying specific causes, feeding is usually found to be the best cure of diarrhea.)

3. Success in Alleviating Disorders

In a group of three villages studied, illness days decreased from 245 per child per year to 185.

PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSION

A. Present Coverage of Program Type

This is a pilot project. However, in many countries the pattern is toward provision of combined health and nutrition services.

B. Mechanisms Presently Available for Implementing Program Type

1. Existing Institutions

Meeting houses used for marriage celebrations can be used as feeding centers, but clinics for infection control and housing for the Lady Health Visitors need building or renovation for the program.

2. Local Resources (Excluding Personnel)

Information not obtained.

### 3. Local Manpower Source

The program relies in part on village attendants who are local girls. However, it also uses lady health visitors at the direct service level who are brought in from outside the village with two and a half years of training.

Source of Information

1. Taylor, C., DeSweemer, C., Uberoi, I., Kielman, A., List, M.,  
Malnutrition and Infection in Weaning-Age Punjab Children - Naranwal  
Rural Health Research Center - Progress Report 1971, Baltimore, Md.  
1972.
2. DeSweemer, C., Interviews, July 1972, October 1972, Communication  
to compiler, September 1972.

The first of these is the fact that the  
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TYPE: Combined Nutrition and Health

EXAMPLE: Village Leaders, Short Term Feeding - Cebu, Philippines  
(projected expanded program)

Purpose:

To extend nutrition and related health services to rural communities with emphasis on vulnerable groups.

Delivery System:

Community organized into blocks. Surveillance, reporting, and nutrition education undertaken by indigenous personnel on voluntary basis. Supervision, food supplements and link with health post provided by teacher and health paramedic.

Target Group Reached:

Age: 0-6 years

Location: Rural villages

Impact:

Observation of pilot phase indicates good acceptance and participation by community. Evaluation not yet made. Program can reach almost all households.

Contribution of Other Programs:

Also contributes to general child health, and to some extent to nutritional status and general health of adult population.

Annual Per Capita Cost:

Per individual reached: \$6.00

Per individual in need: \$6.00

Who Pays: Government: \$2.64; External Donor \$3.36;

Local Community: Volunteers.



## I. DESCRIPTION OF PROGRAM

### A. Purpose, Services Delivered, Method of Delivery

The following is a description of a proposed program. It is based on an ongoing pilot project covering about 30,000 people. The current project relies on medical interns residing in each village. Under the proposed expanded program two types of staff would take the place of the intern. Rural health technicians would cover several villages. In addition, the village teacher would receive special training. (Teachers are participating in present program). Overall responsibility for the supervision of the program would be placed in the Ministry of Education.

The purpose of the program is to extend nutrition and related health services to rural communities with emphasis on vulnerable groups.

Services provided include:

(1) Surveillance and reporting of nutritional and general health of pre-school children, and identification of pregnant and lactating mothers. Surveillance of children includes periodic weighings. Other information is also included such as status of food production in each home, occurrence of births, health status of other members of the population (including immunization status). The information is recorded in a notebook and reported to the village teacher.



- (2) Provision of supplements to malnourished pre-school children.
- (3) Instruction in growing, selection, and preparation of nutritious foods.
- (4) Minimal health services delivered by paramedic.
- (5) Referral of individuals requiring additional medical care (including family planning services) to health center. In the Philippines there is one health unit with a doctor, nurse, midwife, and sanitary inspector for each 15 villages.

The services are delivered via organization of the village into units headed by local leaders who perform their functions on a volunteer basis. The average village of about 500 families (3,000 population) is divided into about 10 zones with one leader and assistant leader for each zone of about 40-50 families. Under the zone leader, and chosen by him, are unit leaders each responsible for about 10 families. The unit leaders provide the services described above. These are often assisted by one or more youth assistants which they select. Through the reporting system, unit leaders provide information to the zone leader and the teacher on the status of families. Where a child is identified as malnourished, food for a week or more is provided to the mother. The food may be delivered to the home by the teacher in connection with an inspection visit, or other arrangements, such as pick-up by the mother, may be made.

The overall program is supervised by the village school teacher or school principal. This is facilitated by the fact that teachers in the Philippines are considered part of the national applied

nutrition program and receive some nutrition orientation. The pilot program has been instigated by a member of the health staff who has sought and gained teacher cooperation. However, it is anticipated that a large-scale program would be placed under the direct supervision of the education department with the district supervisor, with responsibility for supervision of schools in 30 to 45 villages, having responsibility for the organization and supervision of programs in his area.

Under the current pilot project the teacher does not receive a stipend for his organizational work, but is given an afternoon free every two weeks to meet with and train the village zone or unit leaders and to conduct related organizational activities. Classes are curtailed to permit the teacher to engage in this activity. Under the proposed program teachers would continue to perform the nutrition supervisory and advisory function without special compensation. The rationale would be that such duties would be considered an official part of their job with some time otherwise designated for teaching made available. However, the education district supervisor, in charge of about 40 villages, would receive a stipend of about \$14/mo. for the added work of supervising the teachers.

In villages located in the more remote areas, about half the total in the Philippines, the teacher would be assisted by a Rural Health Technician (RHT). Each RHT would cover about two villages. His duties would include: assistance with community organization, and training and supervision of zone and unit leaders, assistance with instructions for needy families, and provision of minimum health services.

## B. Administrative Organization and Personnel

### Auxiliary

Unit leader - link with population as described above; functional literacy - on the job training provided by teacher and zone leader - one leader for every 10 households.

Zone leader - supervises four to five unit leaders - training and qualifications similar to that of unit leader.

### Technician/Supervisor

Village teacher - receives two weeks training in applied nutrition. Supervises execution of program as described above. Also provides link with health unit of the municipality. (The teacher refers serious cases to the health unit, or in some instances can send a message to the unit informing it of a case. There is one health unit for each municipality, or about 20 villages.)

### Rural Health Technician (RHT)

RHTs will be assigned to cover about two villages each in the more remote and needy areas. The RHT provides minimum health services and assists with community organization as described. The RHT would be recruited from the local community. He would be given fairly intensive training as described in the appendix under costs.

### Higher Level Supervision and Administration

Education district supervisor. Area covers about two municipalities of about 20 villages each. Supervises all functions of teachers, including nutrition activities. District supervisor in turn reports to an education superintendent.

## II. WHO PROGRAM REACHES

### A. Numbers Served

All households in a village are visited for reporting purposes. A population of approximately 30,000 is currently participating in a pilot test of this approach.

### B. Qualifications for Participating in the Program

#### 1. Location

Located in villages in rural areas.

#### 2. Age Range of Vulnerable Group Members Included in Program

Age range is 0 through 6. Mothers are provided nutrition education instruction.

#### 3. Socio-economic Status

There are no socio-economic conditions for eligibility.

#### 4. Institutional Participation

The basic service unit is the village itself for food distribution and nutrition education. For special medical care the individual must visit a health center.

#### 5. Other Factors Affecting Participation

It is reported that local communities have to date responded enthusiastically to the pilot project and have provided the necessary volunteers.

### C. Estimate of Coverage Program Potentially Capable of Providing

Percent of households covered should approach 100%.

### III. EFFECTIVENESS OF PROGRAM

#### A. Supplement

##### Composition

Some non-fat dry milk is currently used. Under the proposed program a CSM ration is projected.

##### Source or Sources of Food Used

PL 480 commodities are the source of supplement. In addition, home gardens are encouraged.

#### B. Extent Supplement Meets Deficiencies

##### Judgement and Narrative Comment

The supplement would meet all of the protein requirements and 30% of the calories required (using FAO standard) assuming no substitution takes place. An addition of 30% of the calorie requirement is based on the assumption that calorie deficiency of the malnourished child would be about 30%.

##### Intake and Other Information.

Nutrient	: Dietary : allowance : used <u>1/</u> :	: Normal : intake :	: Deficiency :	: Addition : to diet : supplement, : etc.) :	: Percent of : deficiency : met :
Protein	: <u>1/</u> : 21 g :	: : :	: : :	: 24 g : :	: Met with : overage :
Calories	: <u>2/</u> : 1,700 c :	: : :	: 30% <u>3/</u> : :	: 510 : :	: 30% : :
Vitamins and minerals (Specify)	: : :	: : :	: : :	: : :	: : :

1/ Source FAO Standards 1965

2/ Source FAO Standards 1957

3/ Average calorie intake is considered to be roughly 30% below the allowance.

C. Percentage of Those Reached Estimated to Actually Have Significant Deficiency

The aim of the supplementation element of the program is to reach only those in need. The general nutrition education program seeks to cover all families with the surveillance system pinpointing those most in need of special attention.

D. Clinical or Other Evaluations

No evaluation has as yet been conducted.

Observations of the organizer indicates that the program is working well as indicated by such factors as the availability of detailed information on families and by changes in home growing of local foods. Other health related improvements have also been observed; however, specific information was not obtained by the compiler.

IV. CONTRIBUTION TO OTHER PROGRAMS

The program provides minimum health services to pre-school children either directly, or by strengthening the link with the health post via identification and referral. In addition, nutrition education covers pregnant and lactating women, and the promotion of home gardens would have some effect on the nutritional status of the general population. The health referral system is also probably of benefit to the general population, although information on extent of benefit is not known.



# V. PROGRAM COSTS

(Note: Computations are theoretical and illustrative - see appendix - Costs for detail)

## A. Operating Cost Per Village of 3,000 (For initial year of program)

	Central Government	Local Community or Individual	External Donor	Total
<u>Food</u>			\$284	\$284
(Raw Materials)	( )	( )	( )	( )
(Processing)	( )	( )	( )	( )
<u>Transportation to Site</u>				
(includes handling & storage)	\$36		\$95	\$131
(Within Country)	(\$36)	( )	( )	(\$36)
(External)	( )	( )	(\$95)	(\$95)
<u>Provision of Services at Site</u>	\$174			\$174
(Operating Personnel)	(\$135)	( )	( )	(\$135)
(Recurring Material Costs)	(\$39)	( )	( )	(\$39)
<u>Motivation Costs - if applicable, to get consumers to accept food or otherwise participate in program</u>				(included in provision of services)
<u>Administration</u>	\$88			\$88
(Program Direction)	(5)	( )	( )	(5)
(Training)	(83)	( )	( )	(83)
<u>Other</u>				
<u>TOTAL</u>	\$298		\$379	\$677

Number of individuals served which should be used to convert above figures to a per capita basis. 20% of 3,000 = 600 pre-school children = 20% malnourished = 120.  
Total per capita operating cost \$5.60.

A-1. Maintenance Cost Per Village of 3,000  
(annual cost, after first year or two)

Total for village is reduced to \$360

Per capita is reduced to \$3

This calculation is based on the assumption that once the initial group of children are rehabilitated, the program can be maintained by feeding a smaller number. Calculations are explained in the appendix.

B. Cost of Physical Structure and Equipment for 1 village

	:	Government:	:	Local community	:	External donor	:	Total
Per unit	:	:	:	:	:	:	:	
Scales (1 each zone)	:	:	:	:	:	:	:	\$200
Material kit for RHT	:	:	:	:	:	:	:	6
	:	:	:	:	:	:	:	<u>\$206</u>

C. Annual Costs Including Capital Depreciation, Interest on Investment, and Maintenance for 1 village

	<u>Total</u>
<u>Total Operating Cost</u> (from V "A" above)	677
Five year amortization of equipment	41
Total Annual Costs	718
Total per-capita annual costs	\$5.90

C-1. Total Per Capita

Annual cost of subsequent year, rather than first year, operating cost is used is \$3.56.



C-2. Summary of Cost Breakdowns

1. Total start-up costs = \$7.32/child

Operating costs/child = \$5.60  
(first year)

Equipment = \$1.72  
(223 + 120)

2. Total Maintenance Costs

From C-1 above = \$3.56/child

D. If applicable, Annual Per Capita Operating Costs Per IndividualActually in Need in Target Group Reached

As targeted approach is used, costs would be the same as indicated above.

E. If applicable, Estimated Share of Costs of Program Which Can BeCharged Off to Other Program Purposes

An estimate of one-half is made by the compiler, as chargeable to general health.



APPENDIXCOMPILER'S COMMENTS ON PROGRAMPotential Strengthes and Other Characteristics

The program seeks to extend a system of surveillance and referral which covers all village families. The program seeks to enlist the active involvement of the people in the management of activities.

Resulting interest and motivation is suggested in a comment of Dr. Solon, "With this kind of network the program belongs to the people."

The program is based on an existing governmental system, the schools. As projected the program would use an interesting device to tackle the proverbial problem of activating an existing system to adequately perform a new function. On the theory that officials in supervisory positions (education superintendents) exert a very strong influence on this system, special effort would be made to enlist their active cooperation. This would consist of orientation training and a stipend to cover the additional supervision required.

Question Areas

It should be pointed out that while the program has been initiated in pilot form, an evaluation has not as yet been made.

A general question that can be raised with respect to a program which relies on volunteers is its efficiency over time. Given that enthusiam for volunteer work can be instilled initially, can it be maintained over many years? (Should the answers be negative, it may still be that a minimum stipend could maintain momentum at a low cost.)

## PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSION

### A. Present Coverage of Program Type (Worldwide)

Similar pilot projects are underway which use the concept of a reporting system for every home, based on volunteers, in Colombia and Thailand. Information as to other instances of this approach has not been obtained.

### B. Mechanisms Presently Available for Implementing Program Type

#### 1. Existing Institutions

The program makes use of the existing education system which is based in each village.

#### 2. Local Resources

The local community contributes heavily in terms of zone and unit leader volunteers which form the front line of the program.

COSTS:

The computations described below are based in the main on off-the-cuff estimates developed in conversation with Dr. Solon. They should be considered illustrative only.

I. COMPUTATION OF COSTS FOR FIRST YEAR - Refer to table on Costs - item V. (main text).

A. Food and Transport:

On the basis of national surveys of the rural population a calorie deficit of 30 percent is assumed. (2) Using the calorie allowance for the older age group - 1700 calories, 30% = 510 c = 138 g. of CSM. CSM is suggested rather than lower cost wheat flour, etc., because it can be easily prepared (138 g. of CSM provides 24 g. of protein).

A period of three months is projected for the feeding of a single child. 90 days x 138 g. = 11.97 kg. = 26.3 lbs.

$$26.3 \text{ lbs} \times 9\text{¢} \text{ (per lb.)} = \$2.37$$

$$26.3 \text{ lbs} \times 3\text{¢} \text{ (ocean freight)} = \underline{\$ .79}$$

\$3.16

Inland transport estimated at 30¢ per recipient per year.

In the table all per capita figures are multiplied by 120 to get costs per village. 120 is taken as the number of malnourished pre-school children.

B. Provision of Services at Site:

1. Operating Personnel Salaries:

Rural Health Technician (RHT). The RHT would be assigned two to three villages. But only those villages in the poorer and more remote areas would have RHTs. On a national basis 1 RHT per villages or 12,000 population is assumed.

RHT salary:  $12 \times \$35/\text{mo.} = \$420$

Dividing this salary by 4 villages = \$105/village

Teacher salary = \$30/year (attributed to program)

(Under the projected program, the teacher would have one formal period of a half day every two weeks devoted to the supervision of nutrition activities. Applying this time against his salary, the yearly cost would be about \$30.00).

2. Recurring Material Costs:

For medical supplies such as alcohol, plaster, bandages, aspirin, and other medicines = \$13/mo.  $\times 12 = \$156$

\$156 divided by 4 villages = \$39/village

C. Motivation:

No special expenditures.

D. Administration

1. Program Direction:

Education Supervisor: \$4.20/village

(Stipend of \$14/mo. would be provided for overseeing program which would be included as an additional official duty = \$168/year. Supervisor has responsibility for about 2 municipalities or 40 villages. So cost per village =  $\$168 \div 40 = \$4.20$ ).

Education superintendent: \$.50/village

(Stipend of \$28/mo. = \$336/year. Superintendent has responsibility for 30-40 municipalities which works out (on a basis of 35) to \$.48 per village)

Total Program Direction Costs = \$4.70/village

## 2. Training

### a. Summary of Training in Initial Year of Program (calculations appended in Annex I)

#### Rural Health Technician

Training first year (\$32 initial) + (\$127 follow-up) = \$159  
 $\$159 \div 4$  villages covered by technician = \$40/village

#### Two Week Teacher Training

\$42 per teacher - 1 teacher trained/village = \$42/village

#### Orientation for Education Supervisor

\$33 per supervisor + 40 villages = \$.80/village

Total initial training = about \$83/village

### b. Yearly Follow-up Training

#### (1) Rural Health Technician

2 week refresher course at \$42 =  $\$42 \div 4$  villages = \$10/village

(2) Three Day Refresher Orientation for Teachers

Instruction           \$1.30/student

Per diem             6.00/student

Transport            10.00/student $\$17/\text{student} = \$17/\text{village}$ (3) Three Day Refresher Orientation for Education Supervisors $\$33/\text{student} + 40 \text{ villages} = \$.80/\text{village}$ (4) Total Recurring Training Cost per Village

(sum of (1) - (3) above) = (\$28)

Recurring training cost adjusted for turnover rate of  
 trainees = \$42 (4 year length of stay used)

## II. COMPUTATION OF MAINTENANCE COSTS - (Referred to in A-1. of V. - Costs main text)

Computation as follows:

It is assumed that after the first year of the program the bulk of malnourished children will have been rehabilitated. Thereafter it is assumed that the program can be maintained, including both covering new entries and other children who become malnourished by feeding 60 children. (This would be new entries 0-1 of 20, plus 1/3 of the original base of 120, or 40). In that case total costs would be reduced from \$6 x 120 children to \$6 x 60 children, if it is assumed that all cost factors vary with the number of children served. But since the reduced expenditure of \$360 is in effect the theoretical cost for maintaining a program that "protects" 120 children, per capita costs of "protection" would equal \$360 divided by 120 or \$3.



Alternatively, if, due to effective nutrition education, number of new entries in the maintenance phase was reduced to those becoming eligible on the basis of age - 20, per capita costs of "protection" would be \$1.

## ANNEX I

## Calculation of Costs of Training for Initial Year of Program

A. TRAINING OF RURAL HEALTH TECHNICIAN

Training for the first year is projected as follows: 3 months initial, then 2 weeks out of each of the following 3 quarters. The RHT would be performing a function during most of this training so that his regular salary which he would receive during training is not counted as an additional cost.

Training cost is computed as follows:

(1) First Three Months

Teachers give 3 month course to 10 students (this repeated 4 times per year to cover 40 students). Teachers are part of regular health teaching staff. They would be provided additional stipends for the courses as follows:

1 teacher at \$29/mo. = \$87

2 teachers at \$14.50/mo. = \$87

Transportation (including students) = \$103

Consultants fee = 179

Materials = 36

**\$318**

$\$318 \div 10 \text{ students} = \$32/\text{student}$

(The above estimates do not include per diem for the 3 month training period. Information was not obtained as to whether the salary could be attributed toward this item).

(2) Two Week Continuation Training

Three week courses for 10 students each course, at cost for each course of \$42 (stipends for 3 staff teachers)

$\$42 \div 10 = \$4.30/\text{student}$  plus \$28 (\$2.00/day per diem per student) plus \$10.00 for transportation = \$42

$\$42 \times 3 \text{ courses} = \$126$

## B. TWO WEEK TEACHER TRAINING

Also approximately \$42.

## C. THREE DAY ORIENTATION

Education Supervisors and Education Superintendents

Teacher costs =  $\$24 \div 35 \text{ students} =$  \$ .80/student

Per diem 12.00/student

Transportation\* 20.00/student

\$33

(\*training undertaken at centralized location)

Source of Information

- (1) Solon, F. "Organizing the Community for Nutrition Program,"  
Mimeo, August 1972.
- (2) Solon, F., Interviews, September 1972
- (3) Catholic Relief Services - Philippines - FY 1973 Program Plan
- (4) AID - Title II, Public Law 480 - Total Commodities Shipped by  
Program Sponsor, Fiscal Year 1971; Recipients by Program Type  
and Sponsor.

TYPE: Combined Nutrition and Health

EXAMPLE: Young Women Volunteers, Nutrition Education - Colombia  
(U. delValle)

Purpose:

To extend general ~~community~~ health services, which include surveillance, nutrition education and health care for the pre-school child.

Delivery System:

Volunteers provide general surveillance, nutrition education and immunization in the home and constitute a link with health pests.

Target Group Reached:

Age: Whole family including pre-school child

Location: Semi-urban area (should be also applicable in rural area)

Impact:

Significant improvement in nutritional status and high reduction in infant mortality. However, a problem of leveling off encountered.

Program appears capable of reaching majority of population in rural areas.

Contribution to Other Programs:

Provides general health services for child and for adult population (latter includes family planning).

Annual Per Capita Cost:

Per individual reached: 42¢ (under assumption (a) that costs shared with other members of population and cost of existing health infrastructure is not included); \$2.10 (if assumption (b), whole

cost-less infrastructure born by vulnerable groups)

Per individual in need: \$1.60 assumption (a); \$8.00 assumption (b)

Who Pays: Government: 42¢; Local Community; volunteers.

## I. DESCRIPTION OF PROGRAM

### A. Purpose, Services Delivered, Method of Delivery

The purpose of the program is to extend the coverage of an existing general health system from about one fifth of the population to over 90%. The method is to link health posts with a network of home visiting, performed by volunteers.

The volunteers are backed up by a service unit which provides minimum health care, under the supervision of a general practitioner. Serious cases are referred to a hospital in the area.

### B. Administrative Organization and Personnel

#### 1. Auxilliary

The Health Volunteer is a girl 18 years or older with at least five years of primary school who is recruited from the local community and given basic information on home visit techniques (one month training). She is responsible for 100 families which she visits once every two months. She performs several types of functions. First she collects information on the health status of the family. This includes weight of the child, status of immunization, incidence of diarrhea. Other information included is status of mother such as pregnancy. Second, she personally provides certain health services such as immunization and instruction in selection and preparation of foods. Third, the volunteer provides two-way referral. For example, she may refer a

mother and child to health post for assistance. Or, alternatively, a home in which a high incidence of diarrhea is reported will receive a visit from the sanitary inspector.

2. Technician/Supervisor

A Service Unit consisting of two registered nurses and two nurse aides supervises the 13 volunteers. The data collected by the volunteers is reviewed and on the job training is provided. Further, on the basis of the information received from the volunteers, members of the Service Unit also provide direct assistance to families and as necessary refer families to the health posts or other facilities.

3. Higher Level Supervision and Administration

Costs are calculated on the basis of health infrastructure personnel providing supervision of the Service Unit and the volunteers, as part of their existing duties. If, however, a full time doctor and nurse were added for supervision of the system described, costs would be approximately double.

The personnel described above serve as a means of extending the coverage of an existing health system. Estimated effective extension is from around one fifth to almost the total population. The current



system consists of the following:

- For every 5,000 population - Health Post staffed by nurse  
aid with a monthly visit from  
an M.D. (The health post covers  
a radius of about three miles.)
- For every 10,000 - Health Center staffed by an M.D.  
a registered nurse and one or  
two nurse aides.
- For every 20,000 - Hospital Health Center
- For every 100,000 - Zonal Hospital
- For every 3,000,000 - Regional Hospital
- (Cost of the ~~normal~~ health program is estimated at  
about \$2.00 per capita per year.)

## II. WHO PROGRAM REACHES

### A. Numbers Served

Each volunteer covers 100 families. The current  
program uses 13 volunteers and covers 1,300 families or  
7,000 population.

### B. Qualifications for Participating in the Program

#### 1. Location

The program is located in a semiurban area.

#### 2. Age Range of Vulnerable Group Members Included in Program

The entire family is served with attention included  
for the 0-5 age group.

3. Socio-economic Status

Coverage roughly 93% of the population via the home visit method.

4. Institutional Participation

Not applicable.

5. Other Factors Affecting Participation

Participation would appear very high as indicated by the fact that the program covers 93% of all children under five years, with only a small percentage of families not accepting the program.

C. Estimate of Coverage Program Potentially Capable of Providing

As indicated above, over 90% coverage is provided.

III. EFFECTIVENESS OF PROGRAMA. Supplement1. Composition

No supplement is used. Reliance is placed on nutrition education.

2. Source or Sources of Food Used

Not applicable.

B. Extent Supplement Meets Deficiencies1. Judgement and Narrative Comment

Not applicable.

2. Intake and Other Information

Not obtained.

C. Percentage of Those Reached Estimated to Actually Have Significant Deficiency

In 1968, when program started, of 1,332 children 322 were in stages I, II or III of malnutrition or 24% of total.

D. Clinical or Other Evaluations

The following measures of change in nutritional status are presented:

1. Change of Status of Children from 1968 (initiation of Program to 1970\*

<u>Children in</u> <u>1968</u>	<u>Status of these groups</u> <u>in 1970</u>			
	<u>Normal</u>	<u>Stage I</u>	<u>Stage II</u>	<u>Stage III</u>
Normal Group	68%	11%	2.5%	--
Stage I Malnutrition Group	40%	48%	12%	--
Stage II Malnutrition Group	8%	45%	45%	1%
Stage III Malnutrition Group	1%	13%	67%	13%

2. Comparison of Status in First Year After Birth

1969 35% of pre-school population malnourished

1971 13% of pre-school population malnourished

3. Infant Mortality

1968 80/100  
1970 40/1000

4. Natality

1968 47/1000  
1970 40/1000

\*Weight for age measurements used are based on a projection of the growth track of the child during the early months of life when he is presumed to be receiving satisfactory diet and therefore developing in terms of his genetic potential.

Since 1970, a leveling off has been observed. It would appear that a hard core of families remain which have not shown improvement in nutritional status. This is estimated at about one fifth of the total.

#### IV. CONTRIBUTION TO OTHER PROGRAMS

The program provides general health services for the entire family. This includes family planning services. (30% of all women in fertile age are reported to be currently using effective family planning methods, as compared to 5% at the start of the program.)

V. PROGRAM COSTSA. Annual Operating Cost Per Person (adults and children)

(For description of budget breakdown, assumptions used, and alternative modes of computation, see Appendix page) -

	Central Government	Local Community or Individual	External Donor	Total
<u>Food</u>				Not applicable
(Raw Materials)	( )	( )	( )	( )
(Processing)	( )	( )	( )	( )
<u>Transportation to Site</u>				Not applicable
(includes handling & storage)				
(Within Country)	( )	( )	( )	( )
(External)	( )	( )	( )	( )
<u>Provision of Services at Site</u>				\$.42
(Operating Personnel)	( )	( )	( )	(.40)
(Recurring Material Costs)	( )	( )	( )	(.02)
<u>Motivation</u>				Part of service function
Costs - if applicable, to get consumers to accept food or otherwise participate in program				
<u>Administration</u>				Partly included under services - see appendix
(Program Direction)	( )	( )	( )	(Not)
(Training)	( )	( )	( )	(obtained)
<b>TOTAL</b>				<b>\$.42</b>

B. Cost of Physical Structure and Equipment

	Gov't	Local community	External Donor	Total
<u>Per unit</u> <sup>1/</sup>				

<sup>1/</sup> Rental of meeting space for 13 volunteers at \$36 per year included in operating costs. Costs of back-up health infrastructure not included - see discussion in appendix.

C. Annual Costs Including Capital Depreciation, Interest on Investment, and Maintenance

	: Total	: Central Government	: Local Community or Individual	: External Donor
<u>Total Operating Cost</u> (from V "A" above)	:	:	:	:
<u>Total of: *</u>	:	:	:	:
(Depreciation)	:( )	:( )	:( )	:( )
(Interest)	:( )	:( )	:( )	:( )
(Maintenance)	:( )	:( )	:( )	:( )
TOTAL ANNUAL COSTS	:	:	:	:
<u>Total Per-Capita Annual Costs</u> (can be filled in by USDA)	: \$ .42	:	:	:

D. Annual Per Capita Operating Costs Per Individual Actually in Need in Target Group Reached

\$1.60 per child in need if the program costs are considered shared among the total population reached. (Per capita costs are about 40¢/person (including children) and about  $\frac{1}{4}$  of children are malnourished).  
\$8.00 per child if all costs of program are charged against pre-school children.

See appendix for discussion of costs.

E. Estimated Share of Costs of Program Which can Be Charged Off to Other Program Purposes

The major share of the program costs would appear chargeable to general health of the whole population.  
(Family planning is included.)

AppendixCOMPILER'S COMMENTS ON PROGRAMA. Potential Strengths and Special Characteristics

The approach provides a low-cost two-way link between the services provided and the local community. Even if volunteers are not always available, added costs if home visit personnel were employed would not be large. (A stipend of 20¢ per volunteer per day would add a per-capita cost of 13¢ per year.)

The approach covers the total population.

B. Question Areas

The program has not been very successful in improving the nutritional health of a hard core 20%. (Perhaps this problem could be remedied by the selective use of food supplements.)

CAUSES OF MALNOURISHED STATEA. Reasons for Food Deficiency

Investigations of causes are currently underway. It is speculated that for the majority, the cause may be lack of knowledge as indicated by the response to nutrition education. At the same time, for a smaller or hard core that have not responded to the program, about 20%, the problem may be related to income. This hypothesis is complicated by the fact that some of the lowest income groups have normal pre-school children.



## B. Other Contributing Causes

### 1. Prevalence of Disorders

#### a. Extent of diarrhea

Around 50% might have diarrhea in the absence of the program.

#### b. Extent of Parasitic Infection

Parasitic infection is significant.

#### c. Extent of Disease Effecting Children

The average child would have been likely to have had several of the major diseases effecting children by the time he is five.

### 2. Relative Importance of Disorders

Gastro-intestinal disease is considered, perhaps, the most important cause of death.

### 3. Success in Alleviating Disorders

In 1968, there were approximately 50 cases of diarrhea per 100 children in the course of one month. In 1972, the rate was reduced to 7.5 cases per 100.

Infant mortality rate over the two year period was reduced from 80 per 1,000 to 40 per 1,000.

## PRESENT COVERAGE AND FEASIBILITY OF ITS EXTENSION

### A. Present Coverage of Program Type

Extent of application is not known. However, somewhat different types of approach using community volunteers are being tried in Thailand and the Philippines.



B. Mechanisms Presently Available for Implementing Program Type

1. Existing Institutions

The program is based on a relatively low-cost add on to the health infrastructure. In that sense, a basis for the program should exist in a great many countries.

2. Local Resources

The community does not contribute payment to the program.

3. Local Manpower Source

Volunteers are used, as described, to visit all homes.

BUDGET BREAKDOWN - DESCRIPTION AND DISCUSSION

Budget breakdown is computed as follows:

Salaries indicated are approximate.

Personnel:

Volunteers - no stipend.

Supervision and back-up

- 2 Registered nurses at \$75/mo. each

2 Nurse aids at \$45/mo. each

Material and Supplies:

-DPT vaccination of 200 children under one each year at 80¢ per dose.

-One scale for each volunteer at \$10 each amortized over 10 year period.

Several important qualifications should be made with respect to this budget.

First, the costs provided are not the total costs of delivery of services but rather the costs of adding services to an existing health infrastructure. Nevertheless, this seems a reasonable mode of calculation in that most countries have some type of health infrastructure, which could, therefore, be assumed as given in the situation. However, this assumption is subject to several further qualifications:

First, the Colombian health infrastructure in Cali is estimated to cover 22% of the population. Many countries may have an infrastructure which covers a much smaller percentage. (Per capita expenditure on health in Colombia is at the high end of the spectrum.) Second, the costing assumes that by extending the reach of the health structure one would not at the same time increase the burden on it and, thereby, require the hiring of additional medical staff. The theory is that the preventive aspect of the program would cut down on curative cases and compensate for increased reach. This remains to be determined. If an additional doctor and registered nurse were added to the system of 13 volunteers and four nurse supervisors, to increase supervision and help with medical care, costs might double.

In addition to the above qualifications, it should be pointed out that the use of \$.42 per capita cost for reaching the entire population is used as a proxy for the cost of reaching the pre-school child. The assumption is that the total population is equally served by the program and that the pre-school child should be treated as one member of that population. If, however, the program is costed in terms of the pre-school child and pregnant and lactating woman alone, then this figure might be multiplied by 5 to equal about \$2.00.

If cost per child in need is taken, this figure would require multiplication by about four = \$8.00.

Source of Information

1. Aguirre, A. C., and Pradilla, A. F., "Newer Community Approaches" presented at Symposium on Young Child Nutrition Programs: Evaluation and Guidelines. Zagreb, Yugoslavia, 23-27 August 1971, In press.
2. Pradilla, A. F. - Interview, September 1972.

ANNEXProgram Elements

The table, following page, lists some of the important elements of the programs described in this compilation. As an aid in comparison, some additional calculations have been included, based on uniform assumptions. At the same time the bases of the data used, to which these assumptions are applied, are not necessarily comparable in all cases. Since a change in the basis used can significantly affect the nature of the final outcome, the comparisons presented should be treated with this in mind.

Note on Program Maintenance Costs

The table does not include program maintenance costs which for some programs may be lower than the first year operating costs. "Program maintenance" is defined here as the cost of running a continuing program divided by the original number of malnourished children who, in the absence of any program, would have remained malnourished. For example, a program might in the first year serve the 100 malnourished children of a village. If in subsequent years, the nutritional health of village children could be maintained by feeding 50 per year, "maintenance" costs would be the costs of the 50-child program divided by 100, the number who, in the absence of any program, would be malnourished. Unfortunately, in most cases available data did not permit this computation.

Guide to Table (opposite page) - Numbers Refer to Vertical Columns

- 1: "B - Blanket Approach" = all members age group reached.  
 "T - Targeted Approach" = program limited to malnourished only.
- 2: "D - Daily Service" = feeding or other service on daily basis.  
 "L - Longer Interval" = weekly or longer, intervals between food distribution, etc.
- 3: "C - Service at Center" = recipient child or family member must come to center/distribution point for food consumption or pick-up.  
 "H - Service at Home" = recipient provided service at home. (Where both approaches used judgement made as to which most central.)
- 4-7: - Per Capita Costs: Includes depreciation, interest and upkeep on capital where applicable.
  - 4 - "Per recipient reached" = cost per recipient.
  - 5 - "Per recipient in need if 50% malnourished" = costs of this particular program assuming (1) all costs are attributed to reaching those in need and (2) those in need are a standard 50% of the vulnerable group.
  - 6 - "Per recipient in need if 25% malnourished" = same as 5 above on assumption that 25% of vulnerable group are malnourished.
  - 7 - "Pro-rated cost - children 0-6" = cost of reaching the malnourished children only in the specific age group indicated pro-rated against entire normal and malnourished 0-6 age-group. Computation is based on the assumption 25% total are malnourished. Base group for computation does not include pregnant and lactating women. (Calculation seeks to give idea of absolute cost of intervention relative to base group: E.g., is it better to spend \$1.25/head on the entire group or to concentrate equivalent on those most in need.
- 8: "Cost Chargeable to Other Programs" - "½" = program provides some other services (such as health or education) about equally with nutrition and that accordingly about ½ costs could theoretically be charged to that other purpose.  
 "L" = contributes to other programs, but only slightly. "0" = program is limited to improving nutrition vulnerable groups.
- 9-11: Who Pays: The breakdown is keyed to cost per recipient reached - column 4.
- 12: "Percent Costs = Food" = includes ocean freight where applicable.
- 13: Figure = age of children; "W" = pregnant and lactating women included.
- 14: "Coverage" = potential rather than actual.  
 "L" - (Limited) = Limited by existing facilities which normally do not cover more than 1/3 of population. "M" - (Medium) = Not based on limited facilities, can reach good segment of population, such as ½ to 2/3, but still can't reach total. "H" - (High) = Covers virtually entire population.
- 15: "% allowance met by intake + supplement" = % allowance met by supplement and original intake together. FAO allowances used unless program planners used different allowance. Assumption made that no substitution for normal diet occurs.
- 16: "Nutriment provided by supplement" = Self explanatory.
- 17-18: "\$/Nutriment: Costs per unit of nutrient delivered are based on total costs of program which often include other functions.
  - 17 - "\$/kg. protein" = total cost per recipient, less cost of sugar equivalent of calories provided, ÷ kilograms of protein provided. Use of cost of sugar equivalent of calories accounts for value of calories in food, thus avoiding assigning all costs to protein.
  - 18 - "¢/1,000 calories" = total cost per recipient ÷ 1,000's of calories provided.



(See opposite page for guide to numbered columns.)

- 1/ Based on 4 mo. stay. Theoretical "program maintenance" costs could be \$30-\$13 depending on number new admissions required. ("Program maintenance" cost is defined cover page A-1.)
- 2/ No continuing cost (given assumptions in text).
- 3/ Per capita costs for reaching all members of population (for Incapacitate cost of product for 1 year at consumption of 15 g/day).
- 4/ "Program maintenance costs" as of third year estimated at \$12 (Program maintenance" defined cover page A-1).

\*Footnotes 5-9 continued on next page.





- 5/ "Program maintenance" costs estimated at \$3 ("Program maintenance" defined cover page A-1).
- 6/ Intended for 0-6 and pregnant and lactating women but currently reaching 4-6 age group.
- 7/ Requires compact villages for high coverage.
- 8/ Ov = deficiency met with overage.
- 9/ Protein in this case is converted to level at 100% bioavailability.





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